SPECIAL DELIVERIES Fifty-plus vendors to show off products for speeding net content delivery. Page 8.

THE RIGHTWORKS STUFF? President Jeff Carr discusses RightWorks' plan to crack the top tier of e-biz suppliers. Page 35.

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NetworkWorld

QUARTERLY VENTURE CAPITAL SURVEY

Fiber optics and wireless ARE HOT, B2B and ASPs ARE NOT. Page 12.

February 19, 2001 Volume 18, Number 8

The network portal: www.nwfusion.com

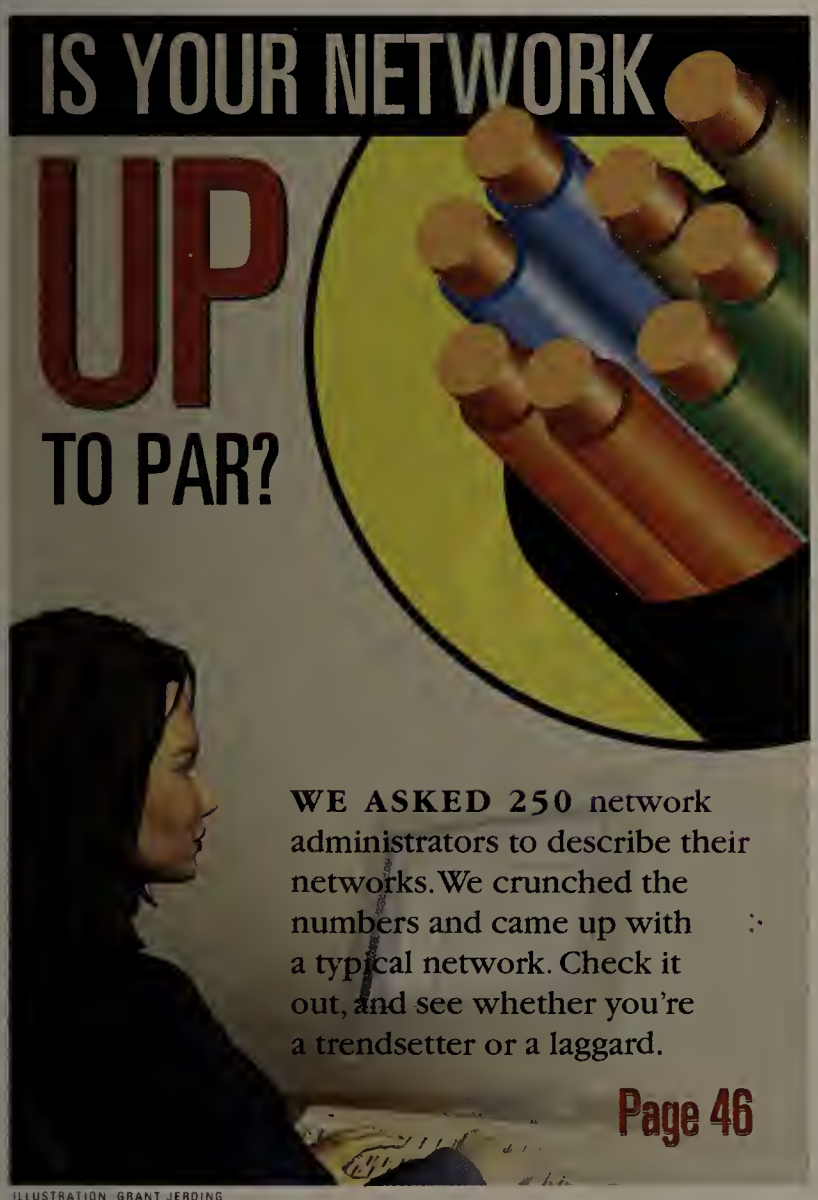


ILLUSTRATION: GRANT JERDING

Net execs warn peers about anti-piracy trap

BY CAROLYN DUFFY MARSAN

Time is running out for network executives who have until the end of this month to turn themselves in to the software police or risk paying steep penalties for running unlicensed software.

The Business Software Alliance (BSA) is promoting a month-long compliance truce in five U.S. cities: Boston, Chicago, Cleveland, Dallas and Denver. People in these cities can acquire needed software licenses without getting in trouble for past infringement.

Although the odds of getting caught with unlicensed software are slim, the consequences are grave. Companies face year-long investigations, fines as high as $500,000 and bad publicity when a settlement is announced.

"They think they won't get caught, or if they do get caught, it will be like a traffic ticket."

Bob Kruger, vice president of enforcement, Business Software Alliance

"It was the longest year of my life," says Neal Underwood, IT director at Best Consulting in Kirkland, Wash., of his

See **Piracy**, page 16

Firm aims to make IP storage soar

BY DENI CONNOR

MELVILLE, N.Y. — Start-up FalconStor next week will launch software for integrating disparate storage resources over Ethernet, an offering designed to protect customers' investments in IP and older storage gear.

The company's IPStor software runs on a Linux-based Intel server, which FalconStor

See **FalconStor**, page 69

www.nwfusion.com

BRUSH UP ON SANS TECH INSIDER OFFERS TIPS

For the latest research on the hows and whys of storage-area networks, check out our Tech Insider feature. It includes an expert debate, resources and more.

DocFinder find it 3051 online

Why Cisco's worried

BY JIM DUFFY

SAN JOSE — Toward the end of each quarterly earnings call, Cisco CEO John Chambers lists challenges the company faces that contribute to its "healthy paranoia" about competition and market leadership.

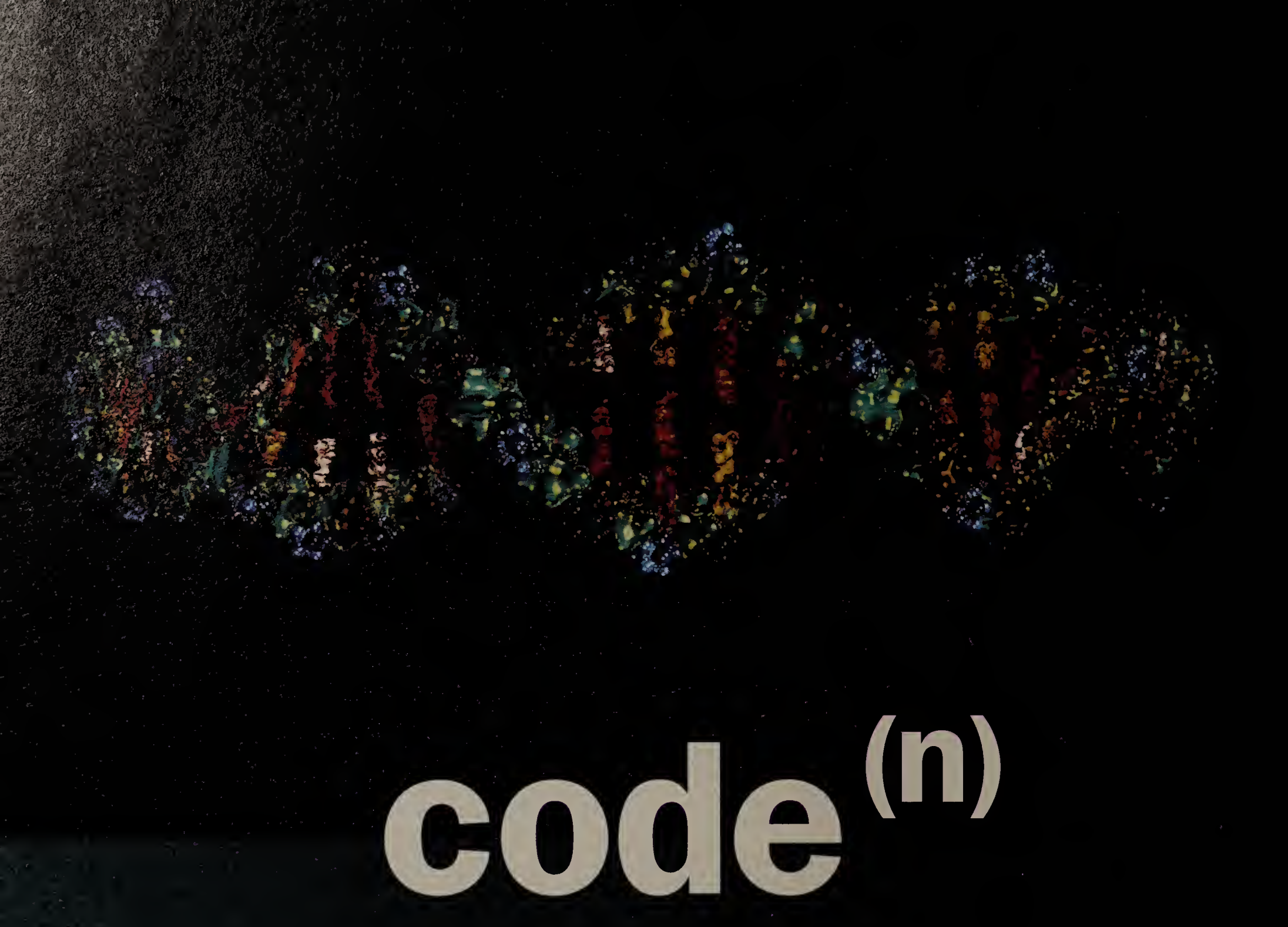
NEWS ANALYSIS

In addition to competition, Cisco's challenges include general economic conditions; government intervention into and regulation of the high-tech industry; component supply; new technology; attracting and retaining talented employees; and maintaining Cisco's culture. All healthy concerns for a company that grows bigger, richer, more powerful and more envied every year.

But coming off a disappointing fiscal 2001 second quarter, which ended Jan. 27, Cisco may have more to be concerned about than usual. Some users and analysts say the sheer size of the company — Cisco's market cap is $222 billion, just behind Intel at $241 billion and

See **Cisco**, page 68

Newspaper $5.00



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SERVICES

assemble deploy

It's hardly a fair comparison. Because in the end, there's no match for heredity. At Sun, we've been designing for the Net since day one. Designing for open, scalable systems. Designing with open, established protocols. Designing for a future that extends beyond our own wallet. That's how we're able to offer a truly open, standards-based architecture for creating smart web services.

Sun™ ONE: The glue that holds it all together

To create, assemble and deploy smart web services you need to leverage legacy systems. You need to traverse multiple types of networks. And you need a loosely coupled software architecture to make it all work. If you're missing even a single piece (or if you're working with mutant strains), the whole proposition falls apart.

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Of course, none of this should come as a surprise. Given our tradition of standards-based computing, you might say it's in our DNA. **sun.com/sunone**

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Sun microsystems

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Optical Internet

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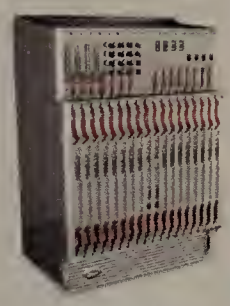

Integral Access' PurePacket Node communicates via MPLS.

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RightWorks' Jeff Carr hopes to tap e-business.

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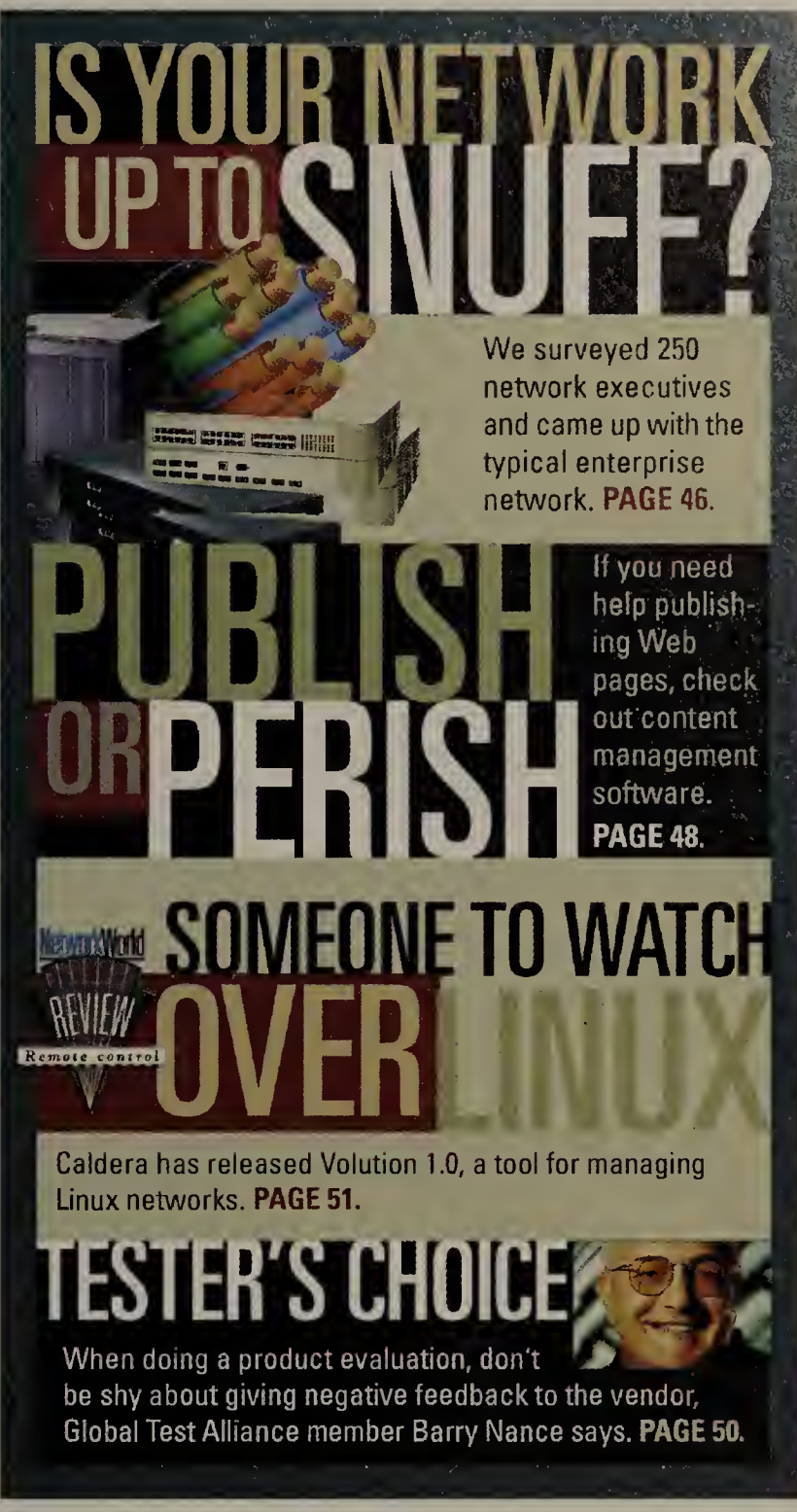

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WINDOWS 2000

Migrating to Windows 2000

Is the operating system ready? Here's what some of our readers had to say about the Windows 2000 rollout when they sounded off in our Face-off forum.

"Let's just say that we have learned over the years that Microsoft doesn't always have the best software for all situations as they would like us to believe."

"My current network has almost everything that Win 2000 has to offer already. So I think that I'll be 'betting the farm' on technology that works now."

"The decision to adopt or not to adopt Win 2000 is not as Yes or No as either [Face-off author] Nelson or Jeff portrays. A lot will depend on the size of the infrastructure, the type of hardware currently deployed, the competency of your staff/training budget, and your prior experience with Microsoft products."

What do you think? Jump into the discussion. Read more comments and add your two cents. **DocFinder: 3041**

Time to migrate?

Need some advice from the experts before you commit big bucks to a new operating system rollout? Watch our Webcast, featuring a virtual showdown on the merits of Win 2000. **DocFinder: 3049**

Windows 2000 worries

If you're pondering migrating to Win 2000, check out our Network World Global Test Alliance review . . . consider it aspirin for your migration migraine. **DocFinder: 3050**

Net Know-It-All: Play to win

Congratulations to Robert Breen of Bloomington, Ill. He was January's Net Know-It-All winner! Who will our winner be in February? Maybe you. Play the quiz today! **DocFinder: 2443**

Seminars & Events: Networking made easier

You are just one day away from mastering the new network products and services that can make your business more competitive and profitable. Connect with experts to understand Networking for Small and Medium Businesses. Join *Network World* and *PC World* at this exciting event. **DocFinder: 2554**

COONEY'S CORNER

The best of the NetFlash daily newsletter

Bye-bye Napster

Seems it's no longer a question of whether Napster will shut down, but when. A federal appeals court decision last week said the music-copying service could be liable if its users trade illegally copied songs (**DocFinder: 3056**). The panel ruled what most observers held all along: Napster is violating copyright laws with its digital music file sharing system. The finding effectively signs the death warrant for Napster.

The rock group Metallica, vocal opponents of Napster, expressed approval of the court's decision. "We are delighted that the court has upheld the rights of all artists to protect and control their creative efforts," the band said.

Meanwhile, Napster's followers are crying in their milk and calling for boycotts of certain record companies. To those people I say, sorry folks, most artists like to get paid for their work. Period. Good-bye and good riddance. Time to move on. Nothing to see here.

Nortel's woes worsen

Nortel Networks last week said that growth will slow considerably this year due to a "more severe economic downturn" and that 10,000 employees will lose their jobs. **DocFinder: 3052**

Start-ups IPHighway, Cyber IQ facing tough times

Start-up IPHighway, which makes software for bandwidth provisioning, says it will make unspecified reductions in its sales and marketing departments. Meanwhile, Cyber IQ is looking to sell its technology. **DocFinder: 3053**

— Michael Cooney, associate news editor

Sign up for this e-mail newsletter online. DocFinder: 3850

COLUMNISTS

Compendium

We have a winner

Overwhelmed by the number of entries in the Bill Gates photo caption contest, Fusion's august judges spent the weekend coming up with a winner. See who wins those wonderful *Network World* tchotchkes. **DocFinder: 3043**

Nutter's Help Desk

Breaking into IT

Ron Nutter helps a reader who wants to move from public relations to a career in IT. **DocFinder: 3044**

Keeping Current

Taking a nap(ster)

Who cares about Napster? Fred McClimans says the whole thing is much ado about nothing — what you should really care about is what John Ashcroft is going to do about the Microsoft antitrust case. **DocFinder: 3045**

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NEWS BRIEFS, FEBRUARY 19, 2001

Anna virus causes quite a racket

Last week companies in the U.S. and Europe had to cope with a new e-mail-borne virus, dubbed Anna Kournikova because it carried a JPEG attachment of the tennis star. The JPEG executed a Visual Basic Script that grabs directory names and addresses from the Microsoft Outlook Express directory to mail itself to new victims. The virus didn't do damage such as wiping out computer files, but its success in setting off an avalanche of unintended e-mail did result in mail server crashes and network congestion at some firms. A Dutch computer virus writer claiming to have written the virus turned himself into police in the Dutch province of Frieslan. Authorities arrested the man and then released him after taking away his computer.

AP PHOTO

Tennis star Anna Kournikova was the subject of last week's virus outbreak.

Mgmt. doors swing at three firms

Executive management shake-ups roiled the waters at many application software houses last week. SAP AG said the president of its U.S. subsidiary, Chris Larsen, resigned "to pursue other opportunities." He had held that position since late 1999. At SAS Institute, President and COO Andre Boisvert resigned after only six months on the job. The company said the resignation did not mean there was a falling out between Boisvert and CEO Jim Goodnight. "Andre's departure does not signal any changes in the direction of the company, and SAS is still firmly committed to preparing for an IPO," Goodnight said. And finally, John Ryan, president and CEO of Entrust Technologies, resigned, reportedly to "seek new challenges."

Microsoft's Corel investment draws scrutiny

Microsoft is under the antitrust microscope again as federal investigators review the company's $135 million investment in rival Corel. Investigators are evaluating whether the investment reduces competition in the market for office software. Microsoft Office dominates the market, which includes Corel's WordPerfect Office. However, Corel is key competition because it is available on Linux, an alternative to Windows. Microsoft officials say they are cooperating with investigators.

HP moves to match Sun, Microsoft

Hewlett-Packard last week launched a software suite as part of its "software ecosystem," which is designed to help customers develop, integrate and deploy electronic services and manage IT infrastructures. The suite is "a move from a do-it-yourself model to a do-it-for-me model," says CEO Carly Fiorina. The software, HP Netaction, is a response to the recent launch of products from rivals Sun and Microsoft. HP also announced expansion of its OpenView suite. HP Netaction was formed by grouping together the portfolio that HP received when it acquired Bluestone Software with applications such as HP e-speak and HP Process Manager. The acquisition of Bluestone, announced last October, was completed three weeks ago.

NorthPoint presses Verizon claim

NorthPoint Communications has been given the go-ahead to take a $1 billion compensation claim against Verizon to the Superior Court in San Francisco. DSL service provider NorthPoint filed suit against Verizon last December in response to Verizon's attempt to terminate an agreement to merge the two companies' DSL businesses. The action seeks a trial by jury and damages of more than $1 billion. It also looks to enforce Verizon's obligations under the binding merger agreement between the two companies made on Aug. 7, 2000, NorthPoint said.

Microsoft taps Belluzzo as president

Microsoft last week named Rick Belluzzo president and COO, replacing the retiring Bob Herbold. Belluzzo had been group vice president overseeing Microsoft's .Net platform and MSN. Prior to joining Microsoft in September 1999, Belluzzo, 47, was CEO of Silicon Graphics, and before that, executive vice president of Hewlett-Packard.

Microsoft's new president and COO Rick Belluzzo.

Houston, we have a call on line one

One of the most distant long-distance phone calls in history was recently made when a NASA astronaut aboard the Space Shuttle Atlantis phoned Mission Control using Cisco IP voice equipment. On Feb. 11, astronaut Marsha Ivins, using a Cisco softphone software on a laptop, called Flight Director Bob Castle at the Johnson Space Center in Houston. The packetized voice call was sent via satellite from the shuttle to Houston, where a Cisco Call Manager and VG-200 voice-over-IP gateway helped connect the call to Castle's desk. Both Ivins and Castle commented on the call's clarity.

Show to feature products for boosting content speed

BY APRIL JACOBS

NEW YORK — More than 50 vendors and people are expected this week to attend the Content Delivery Networks Event 2001, which will feature an array of hardware and software aimed at speeding up and easing the management of Web and e-commerce sites.

The show, which kicks off Tuesday, will play host to announcements from Chutney Technologies, SpiderCache, Exodus Communications and Volera, and NaviSite.

According to a report to be delivered at the show by The HTRC Group, growth in the number of Web sites as well as e-commerce is leading companies to differentiate themselves by offering multiple types of content, including streaming media and dynamic content delivery. Companies also have to meet the demands users put on them to deliver that content as quickly as possible.

Chutney will introduce PreLoader 2.0 software, which runs on Linux, Solaris and Windows, and promises to speed up dynamic content delivery. PreLoader caches elements of content and hands it over to the application server when requests come in from surfers.

It speeds Web sites by caching the content elements of dynamically constructed pages that would otherwise have to be recreated by the application server.

PreLoader supports Java-based and application service provider-based page-generation schemes, and the company claims it is interoperable with leading application servers, including BEA Systems' WebLogic, IBM's WebSphere and BroadVision's One-to-One Commerce.

Exodus and Volera will announce a partnership that will give Exodus customers access to hosted content distribution and acceleration services. The alliance is part of an enhanced content distribution network Exodus is rolling out.

Exodus says Volera provides another choice for customers looking to speed up Web sites at the server level.

Lydia Leong, an analyst with research firm Gartner Dataquest, says as the content distribution market grows, it will be a threat to Web hosting companies because it means users will access content at some point outside data centers.

NaviSite is planning to announce streaming services partnerships with Madge.web, SMC Networks and Speedera Networks. By using those partner networks, NaviSite can offer more global reach to users.

For its part, SpiderCache plans to offer a new version of its SpiderCache software for Unix and Windows NT.

The Version 1.5 software includes features designed to let users clear the cache as well as make installation and configuration of the cache simpler via a wizard.

In addition, a new feature can reduce the size of images being cached for delivery from 5% to 90%.

Network World *Senior Writer Jennifer Mears contributed to this article.*

Added benefits

The following companies will make product/partnership announcements at the Content Delivery Networks Event 2001:

Company	Announcement/benefit
Chutney	New cache software designed to speed content delivery.
Volera	Partnership with Exodus to provide caching.
NaviSite	Partnership with streaming companies to broaden network access.
SpiderCache	New cache software that supports windowsNT and Unix, and features installation and configuration tools.

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Microsoft fleshes out its .Net server lineup

BY JOHN FONTANA

REDMOND, WASH. — Two of the last pieces of Microsoft's newest line of enterprise servers rolled off the assembly line last week, but the software means little until corporate Windows 2000 deployments are complete.

Microsoft shipped its Internet Security and Acceleration Server 2000 (ISA), a firewall and cache, and completed development on Application Center 2000 server. AppCenter, which is designed for managing Web server farms, should ship in four to six weeks.

Both servers, which promise to add security and management features to Windows-based networks, are part of Microsoft's .Net Enterprise Server lineup. The eight servers in the line run exclusively on Win 2000, which is showing a slower than anticipated adoption rate, according to Gartner Group. Microsoft is hoping interest in the .Net servers will trigger upgrades to Win 2000.

Seven .Net servers have been completed: Exchange 2000, SQL 2000, Host Integration Server 2000, Commerce Server 2000, BizTalk Server 2000, ISA and AppCenter. An eighth, Mobile Information Server 2001, will ship later this year.

ISA, which replaces Microsoft's Proxy Server, provides access controls, traffic filtering, intrusion detection, bandwidth control, application-layer filters and reporting capabilities. The server marks Microsoft's first serious attempt to enter the security market.

"We were able to trap more than 50,000 instances of the Anna Kournikova virus just last week using content-sniffing features in ISA," said the CTO of a major Western university who requested anonymity. "ISA doesn't have the features of a full-blown firewall, but it is adequate for many IT organizations."

Microsoft faces a challenge in convincing customers it's a security vendor, especially in light of recent breaches of its network.

"We have to build credibility for ISA with certification and third-party testing," says Lucian Lui, product manager for ISA.

Last week, Microsoft also unveiled AppCenter, which lets users "scale out" Web sites by adding more servers instead of deploying larger machines.

"Without this product, Microsoft doesn't have much meat behind its scale-out message," says John Enck, a Gartner Group analyst.

From a single console, AppCenter can manage distributed applications, replicate services for components and files, monitor performance health, and set self-healing mechanisms for hardware and software. It also has application synchronization to ensure an application's content, configuration and components are identical across all servers.

"It consolidates our management, helps improve our processes and removes the inconsistencies of configuring these servers by hand," says Yi Liu, IT manager for Embark, which provides online services for the higher-education market.

The suggested retail price for AppCenter 2000 is $3,000 per processor. The Standard Edition of ISA is priced at $1,500 per CPU, and the Enterprise Edition is $6,000 per CPU. ◪

Server additions

Microsoft last week released two of the remaining three servers that will complete its .Net Enterprise Server lineup.

Server:	Internet Security and Acceleration Server 2000	Application Center 2000
Function:	Firewall and cache	Web server farm management
Features:	Access controls, traffic filtering, intrusion detection, bandwidth control and reporting capabilities.	Monitoring and replication tools, COM+ Component Load Balancing, "single image" management of up to 32 Web servers.

VPN software aims to safeguard handheld devices

BY TIM GREENE

HAYWARD, CALIF. — Certicom and its allies say they can help companies looking to secure communications between wireless PDAs and corporate networks.

Certicom is shipping movianVPN, software that runs on wireless handhelds to connect with VPN servers installed at large corporate sites. Some Cisco and all Nortel Networks dial-up VPN servers support movianVPN, and Certicom says it is talking to other vendors.

Other VPN software clients for wireless devices require their own servers, such as V-One's AirSmartGate, says Barney Dewey, an analyst with Andrew Seybold's Outlook.

The company acknowledges it is working on improvements that security-minded end users will want, such as support for Remote Authentication Dial-In User Service and security tokens. Current authentication consists of user name and password. Certicom is working to get server vendors to support its lightweight elliptic curve cryptography (ECC), which saps less processing power than the commonly used Diffie-Hellman method for determining encryption keys. That will improve response time over the network.

One beta user says the current movianVPN lets his healthcare company evaluate corporate uses of wireless PDAs and how well they meet security requirements. "We want to assess technologies in the real world," says Jim Sanderson, senior systems engineer at Catholic Healthcare West in Phoenix.

Sanderson says five clients are being distributed among executives to figure out who at Catholic Healthcare might best use the devices and what the implications of that use would be. Healthcare computer security is subject to federal rules that are still being defined in an effort to maintain patient privacy. So it is important to evaluate whether PDAs at the end of VPNs can be made secure, he says.

Users of PDAs with movianVPN click on an icon to initiate a VPN connection. The movianVPN software automates connecting to the user's ISP and then linking to the corporate VPN server.

The user types in a password, and software at both ends generates encryption keys. When a VPN session is established, the PDA screen messages the user.

Establishing the VPN session can take 10 seconds to 1 minute, Certicom says, depending on the power of the processor in the PDA. That is in addition to the time it takes to connect to the ISP. Some PDAs are so slow that servers may time out waiting for a response, Certicom says.

So far, Certicom's client supports a rudimentary IP Security/Internet Key Exchange VPN session. Other vendors, such as Nortel, are working with Certicom to enhance these connections.

Firms other than Certicom are working on similar software but have not announced products, says Jon Cordova, a security analyst with Infonetics Research, who has been briefed by these companies with the agreement not to spill the details.

Anyone can download movianVPN free from Certicom's Web site. If customers want support for movianVPN, it costs $30 per client per year, with discounts for bulk buys.

The software supports Casio Casiopeia, Compaq iPAQ and Aero, HP Jornada 540 and 680, NEC MobilePro and Palm III, V and Vx handhelds.

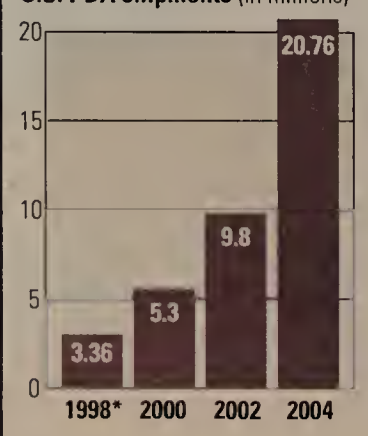
On the server side, it supports Cisco VPN 3000 Concentrators and all Nortel Contivity equipment, as well as VPN gear from Alcatel, Check Point, Radguard and Symantec.

Certicom: www.certicom.com

PDAs proliferate

PDAs are becoming a fact of life that corporate IT executives will have to deal with increasingly in the next few years.

U.S. PDA shipments (in millions)



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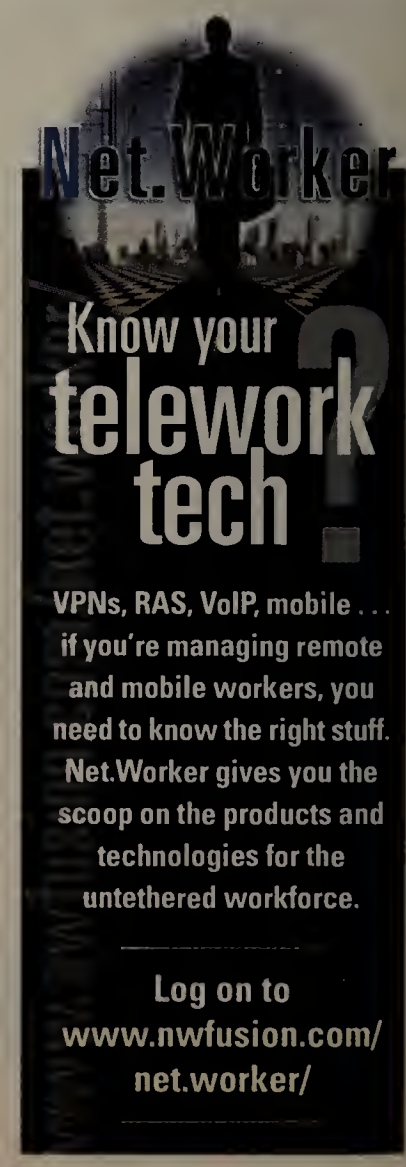

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Venture funding slows for net start-ups

BY CAROLYN DUFFY MARSAN

Venture capital investments in network start-ups are coming back down to earth, but it appears they may be in for a soft landing. Industry watchers predict venture capital activity in areas such as fiber optics, wireless and broadband services will level off at a rate much higher than historical norms.

QUARTERLY VENTURE CAPITAL SURVEY

Despite three steadily declining quarters, the year 2000 was a record breaker for venture capital investment in network companies, according to a recent survey. Altogether, the venture capital community pumped $52.8 billion into start-ups developing network technologies and services.

The year 2000 total reflects an 82% increase over 1999. That year, investments topped $29 billion, which was the previous record.

Network start-ups continue to get the majority of overall venture capital funding. Total investment in all industries was $68.8 billion in 2000, with more than three-quarters of that funding going to network companies.

These figures come from a special analysis of PricewaterhouseCoopers' MoneyTree Survey in partnership with VentureOne conducted exclusively for *Network World*.

Positive outlook

"The outlook for 2001 is fairly positive," says Tracy Lefteroff, global managing partner of the venture capital practice of PricewaterhouseCoopers. "The venture funds still have a lot of money. The dollars are reaching a plateau, but at a higher level than in 1999 or previous years."

In the fourth quarter, investments in venture-backed network companies dropped 20% to $10.13 billion. This compares to a total investment of $12.65 billion in the third quarter and $14.87 billion in the second quarter.

The largest amount of venture capital activity ever recorded for network companies was in the first quarter of 2000, which topped $15.1 billion.

Altogether, 626 network start-ups received funding in the fourth quarter, down from 679 recipients in the third quarter and 849 in the second. The average deal size for the fourth quarter was $16 million, down from $18.6 million in the previous quarter but holding steady with the deals seen in late 1999 and early 2000.

Kirk Walden, national director of venture capital research at PricewaterhouseCoopers, says a significant amount of the deals consummated in the fourth quarter were early-stage investments, which he sees as a sign that the venture capital markets will remain strong in 2001 and beyond.

"With $10 billion available to network start-ups, who's going to go wanting?" Walden asks. "We saw more deals in the fourth quarter of 2000 than we saw in all of 1998. There's nothing wrong with this picture."

Indeed, the 10 largest venture capital deals of the quarter all involved network companies. Leading the pack was Calient Networks, a photonic switching system start-up that received $195 million, and Pihana Pacific, a secure Internet exchange provider that received $190 million (see graphic, above).

Hot start-ups

Among the hottest network start-ups were fiber-optic component manufacturers, wireless service providers and makers of carrier-grade hardware.

The survey shows a marked decline in investment in application service providers and developers of enterprise software applications, but niches such as storage and security remain strong.

With the number and size of deals declining, venture capitalists are exercising more caution and exerting more control over the start-ups they invest in.

"The number of companies wanting funding is as high now as it was six months ago, but the number of deals getting funded is down substantially. So the bar is somewhat higher," says Cliff Higgerson, a partner at ComVentures, a Palo Alto venture capital firm specializing in network start-ups.

"In the past two years, a lot of marginal deals got funded as well as good deals. Now mainly the good deals will get funded," he says. ◪

Top 10 venture deals in Q4 2000

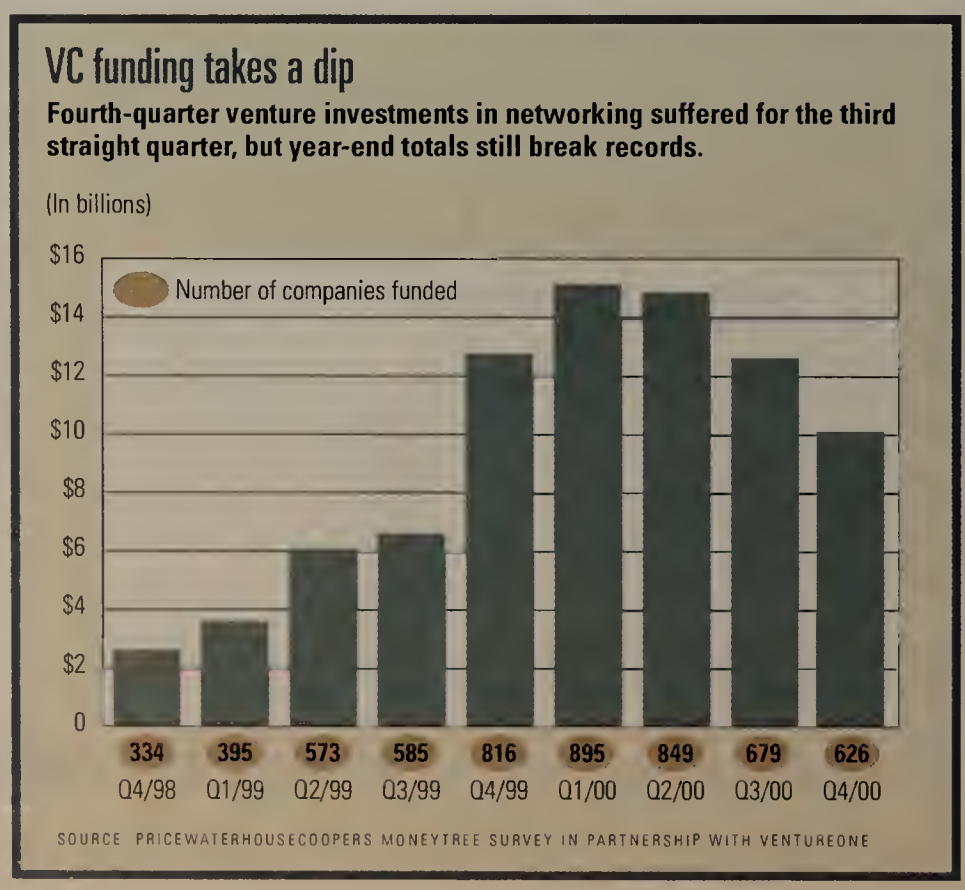
Fiber optics reigned supreme during the quarter.

Company	Description	Funding (In millions)
Calient Networks	Photonic switching system	$195
Pihana Pacific	Secure Internet exchanges in the Pacific Rim region	$190
Adir Technologies	Network management software for carriers	$140.2
Centerpoint Broadband	Optical equipment for carriers	$130
Altrio Communications	Provider of broadband services	$125
Centerbeam	Managed network services	$115
Axsun Technologies	Optical subsystems	$101
Caspian Networks	Optical IP switching	$85
Bandwidth9	Fiber-optic components	$80.8
Fusion One	Software for synching PCs and mobile devices	$80

SOURCE: PRICEWATERHOUSECOOPERS MONEYTREE SURVEY IN PARTNERSHIP WITH VENTUREONE

VC funding takes a dip

Fourth-quarter venture investments in networking suffered for the third straight quarter, but year-end totals still break records.



SOURCE PRICEWATERHOUSECOOPERS MONEYTREE SURVEY IN PARTNERSHIP WITH VENTUREONE

Sun working on peer-to-peer software

BY ASHLEE VANCE

SAN FRANCISCO — Sun last week said it's developing a software platform for peer-to-peer computing it hopes will provide a common base for writing distributed applications.

Speaking at the O'Reilly Peer-to-Peer Conference, Sun Chief Scientist Bill Joy said the platform, called Juxtapose, will be an addition to Sun's family of Web-based programming languages, which includes Java and Jini.

"We wanted to see if we could take some of these ideas and come up with a common core we could imagine using for some of the peer-to-peer projects we want to work on at Sun," Joy said.

Sun's goal is to provide an initial, simple code layer that will let other vendors build applications for peer-to-peer computing that interoperate with each other, he said.

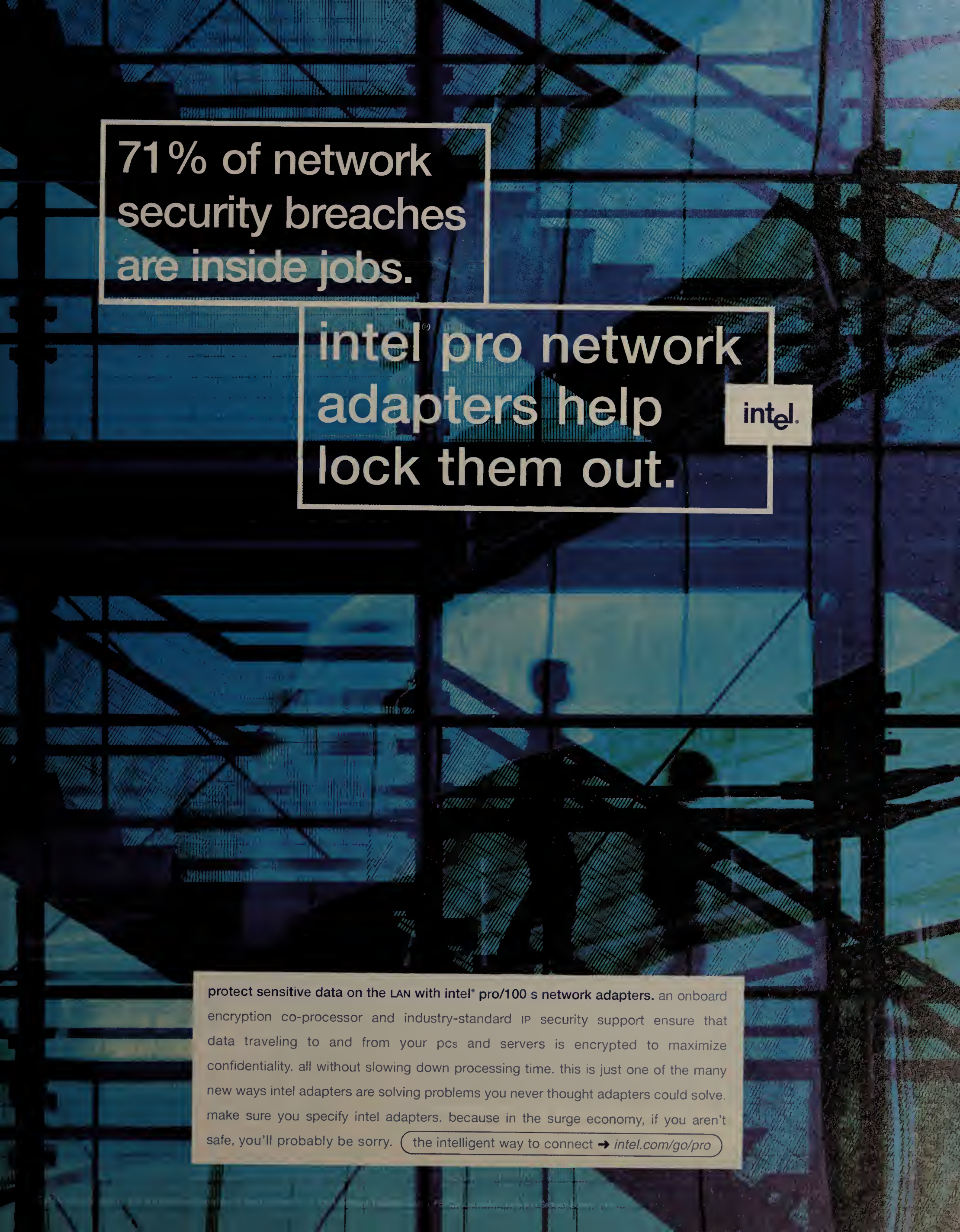
A team of developers at Sun has been working on Juxtapose, or "Juxta" as Joy called it, for six months to a year. In April, the company will host an online conference for software developers where it will release the Juxta specification and try to generate interest in the technology.

Interested users can write to Sun at jxta@sun.com to sign up for the April session.

He emphasized that finishing a security layer in Juxta early should help this peer-to-peer computing platform avoid hurdles that others might encounter over the course of their evolution. In addition to security, Juxta should contain some monitoring features to examine user activity, seeing what elements of peer-to-peer users like and don't like.

Open-source collaboration company CollabNet will host some of the Juxta code, as it does with Sun's StarOffice productivity applications.

Vance is a correspondent with the IDG News Service in San Francisco.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DSL service cutoffs may not be the last

BY MICHAEL MARTIN

SAN FRANCISCO — In the wake of cutting off wholesale DSL scrvice to two of its financially struggling ISP rescllers — and about 8,000 of its DSL subscribers — Covad Communications says it's now working with other resellers having trouble making payments. But, Covad officials say, there are no guarantees there won't be more DSL subscribers left in the lurch.

"I don't have an answer on that," a Covad spokeswoman says when asked if the company could boot more ISPs off its nationwide DSL network. "We're working with each distressed ISP to negotiate something where we can help their users maintain connections."

Covad is still negotiating with 17 other ISPs.

Three weeks ago, Covad cut network service to San Diego ISP Internet Express, leaving about 3,000 DSL users with no service. A week later the company axed service for DSLnetworks, a San Francisco DSL provider, and about 5,000 subscribers, many of whom were teleworkers or at branch offices.

Internet Express and DSLnetworks owed large debts to Covad.

"We just didn't see eye-to-eye with them on repayment plans," Covad's spokeswoman says.

The company is looking for payments wherevcr it can get them because, like many in the DSL industry, Covad has suffcred financially. The company lost close to $400 million during the last thrce quarters for which it has reported financial results, has announced the layoff of 800 employces since November, and has scaled back its network expansion plans to hclp lower costs.

Covad has becn trying to shift subscribers away from certain ISP resellers since December, when the company set up the Covad Safety Net program. The program lets subscribers who get thcir DSL servicc from a financially strapped Covad reseller switch to Covad's retail operation or a more stable reseller with no penalty. Customers can find out if they are eligible to switch at www.covad.com.

DSLnetworks responded by seeking an injunction to stop Covad from approaching DSLnetworks' stranded customers and to restore services. A hearing on the injunction is scheduled for March 8. A judge last week denied a request for an immediate temporary order to stop the customer wooing and turn service back on pending the hearing.

In the request for an injunction, DSLnetworks says Covad is using information it received through nondisclosure agreements to contact the customers affected by the service cutoff and sign them to Covad contracts.

Covad had information on the customers because the company was responsible for handling maintenance and installation issues with the customers' DSL lines.

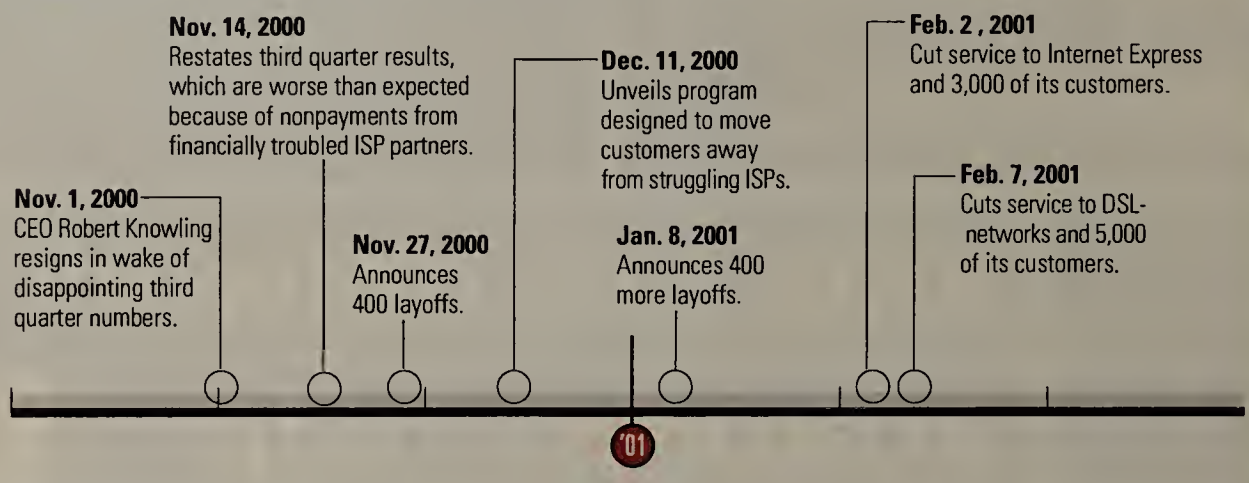
DSLnetworks is working to move its 5,000 stranded customers to other DSL wholesale partners, including Rhythms. The spokesman says that process typically will take between three and four weeks. In the meantime, some customers are using dial-up access, which DSLnetworks is giving away until it can get customers connected to another DSL net.

Adam Guglielmo, an analyst with TeleChoice, says the Covad turmoil is further proof that potential DSL subscribers have to do plenty of research into any ISP they plan to do business with. "I'd tell customers not to go with an ISP they've never heard of if they don't want to deal with any hitches," he says.

But even this approach doesn't guarantee success. ◪

Rough road

Covad has been struggling, partly due to financial problems being suffered by the ISPs that resell its services.



FreeMarkets pack builds private marketplaces

BY KATHLEEN OHLSON

PITTSBURGH — Companies looking to build online marketplaces want the flexibility to make their own changes during the construction process.

FreeMarkcts, an online auction service provider, is trying to scratch that itch with QuickSouree, a software suite announeed last week that will let companies create and manage privatc marketplaces from a Web browser 24 hours a day. The business-to-business online marketplace providcr hosts the environment from its Pittsburgh headquarters, which mcans customers don't need to invest in hardwarc or software.

Customers create a reverse auction environment by setting up parameters, such as when auctions begin and end, accepted currencies and supplier bid increments, says Ken Ramotaur, FreeMarkets' vice president of product development. FreeMarkets, which has run more than 9,000 auctions with 100 buying companies and more than 150,000 suppliers, competes with the likes of Commerce One and B2eMarkets.

Once an auction begins, FreeMarkets customers can track the event from a desktop and "see it blow by blow," Ramotaur says. QuickSource collects the information into a report that offers summary details and the history of bids.

Onc user sees benefits and issues with QuickSource.

"Perhaps the biggest challengc is figuring out the best way to utilize [QuickSource] — what types of produets, what types of transactions, what volume, what regions of the world, etc.," says Michael Brown, vice president of worldwide sourcing at United Technologies. His company will roll out QuickSource March 1.

Tim Clark, an analyst at Jupiter Media Metrix, says firms can save money by running reverse auctions themselves.

"[QuickSource] is user-friendly, but buyers using the product need to know everything there is about reverse auctions, Clark says. "They're really on their own."

Pricing for QuickSource is based on how many suppliers a buyer signs up. Midsize companies can expect to spend less than $100,000 per year, FreeMarkets says.

FreeMarkets: www.freemarkcts.com

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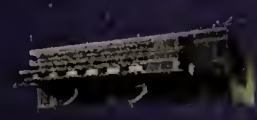

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Piracy,
continued from page 1

involvement with a BSA settlement.

Underwood says he was auditing his company's licenses when a recently terminated employee contacted the BSA's piracy hotline. After the audit turned up 120 missing licenses for Microsoft Windows and Office on the firm's network of 1,100 PCs, Underwood found himself embroiled in months of legal wrangling.

When Best Consulting finally settled with the BSA last October and agreed to pay a $300,000 fine, Underwood was mortified to see the story picked up by local newspapers and radio stations.

"It became very personal," Underwood says. "The IT community here is very small, and it was embarrassing to have this blemish on your record."

Chris Piccirilli, MIS director at Turnberry Isles Resort and Club, says that with 20 years in the IT business he thought he was up to speed on software licensing.

"I always preached that we needed to be in compliance, and we still got in trouble," he says.

Following an upgrade from DOS to Windows, the Florida resort was hit with a BSA investigation. An internal audit showed that Turnberry Isles was missing licenses for 20 copies of Office and 25 copies of Windows running on its 150-computer network. The resort paid an $85,000 fine in June.

"We're doing internal audits twice a quarter"' says Piccirilli, who keeps detailed records and invoices in a safe. "We have a letter going out to employees three times a year that says anybody caught loading software will be terminated."

Few network professionals realize that their companies are liable for $150,000 in damages for each unlicensed software package. They certainly don't see themselves as criminals when they get behind on purchasing software licenses. And they find maintaining up-to-date licenses to be a tricky and time-consuming task, particularly for far-flung and fast-growing organizations.

"Our top management is now extremely, painfully aware of software licensing," Underwood says, adding that the BSA settlement affected the firm's profitability last year. Being out of compliance "has the potential to put you out of business. . . . This is one of those hidden threats to your company."

The BSA, a Washington, D.C., trade group that includes Microsoft, Symantec, Network Associates and other software makers, has enforced copyright laws for eight years. But, with more than $58 million in collections, the BSA is getting more aggressive in going after scofflaws and encouraging voluntary surrenders through high-profile media campaigns. BSA uses the money it collects to fund its education and enforcement programs.

Last year, the BSA settled with more than 200 U.S. violators and identified 34 of them, including Temple University, the City of Issaquah, Wash., and a Pepsi-Cola bottling plant in Illinois. Manufacturers, law firms and even software companies came up short when the BSA audited their operating systems, applications and utilities.

Altogether, the BSA collected $4.5 million from the identified companies last year. Fines ranged from $33,000 paid by North End Composites, a Rockland, Maine, manufacturer of fiberglass boats, to $434,489 levied against North American Medical Management of Texas, an HMO management company in Houston. The average settlement was $132,654.

Most violators never caught

However, the dozens of companies caught last year represent only a small fraction of the overall software piracy problem. The BSA says more than $3 billion in retail software revenue is lost each year due to piracy in the U.S., and that one in four software copies is illegal. BSA uses its lawsuits and the publicity surrounding them to hammer home the message that businesses face hefty fines if caught without enough licenses.

Bob Kruger, vice president of enforcement for the BSA, says offenders run the gamut from companies that deliberately make illegal copies of software as a way of cutting IT costs to those whose software management policies aren't being followed by all employees.

"One of the reasons this happens is that people don't fully appreciate that what they're doing could have serious consequences," Kruger says. "They think they won't get caught, or if they do get caught, it will be like a traffic ticket."

Most companies get caught because a current or former employee contacts the BSA's hotline, which receives a dozen or more calls a day. A phone call launches an investigation by the BSA, which can access software publishers' databases to determine how many copies a company is licensed to run.

BSA usually invites the company to cooperate with its investigation. But in some cases, the BSA will get a court order that allows it to conduct a surprise audit with the U.S. Marshals Service in tow.

For example, the BSA in September raided Ernie Ball, a California manufacturer of musical instruments.

The BSA typically demands millions of dollars in damages but then negotiates that figure downward. While the BSA can seek $150,000 for each unlicensed copy, the group often settles in the $25,000 to $50,000 range.

"If a company does get caught, it's too late to go out and buy the software," Kruger says. "Otherwise there's no incentive for companies to deal with this on their own. We make it expensive for the companies that get caught."

Most of those caught by the BSA say any illegal copying of software was accidental and done by rogue employees. Nonetheless, the BSA forces these companies to delete the illegal software, buy legal copies, put a software management program in place and pay damages.

"Many companies are under pressure to keep their costs down, but they don't steal their office furniture off the truck," Kruger says. "One of the reasons people steal software is that it's easy to do."

The City of Issaquah, Wash., is typical of how an organization can inadvertently run afoul of copyright laws. City administrator Leon Kos says his sole IT staff person didn't understand software licensing and neither did he. When an audit found the city was missing 120 licenses for software from Adobe, Autodesk, Microsoft and Symantec, the city agreed to settle with the BSA for $80,000.

Kos now forbids the city's 200 employees from installing software on their PCs without approval from the IT department. He also expanded the IT department to three people and requires regular audits.

Still, Kos isn't sure that he's in full compliance.

"Licensing requirements are so complex," he says, adding that if the BSA conducted another audit, "I'm confident they would find a problem."

Companies frequently run into copyright problems with Microsoft operating systems and applications.

"Microsoft products are the most confusing," says David Roth, a technical support analyst with Americo Financial Life and Annuity in Kansas City, Mo. "They have full-blown licenses, upgrades and upgrades from an upgrade. Twice they've changed the way they do their licensing in the last three years."

Roth was conducting an audit of the insurance company's 1,000 PCs, servers and laptops when the BSA contacted him. Roth says Americo was short about three dozen licenses for Microsoft Word, Office, Project, Access and Windows. Americo paid the BSA a $215,000 fine.

"At one time it was believed we had a site license and could install Microsoft products wherever we wanted," Roth explains.

Now Americo runs all software purchases through one IT staff member and uses one software reseller.

Despite the consequences, few network managers are fired or even disciplined if found short on licenses.

"We didn't fire our IT person because we didn't consider it his fault," Kos says. "We had him totally buried in keeping our systems going. . . . We didn't fully understand what was required."

Indeed, IT recruiters report that software licensing is never mentioned when companies interview candidates for top IT management positions.

"In all the CIO searches that I've done, I can't recall a single discussion with a client about software licensing," says John Daily, managing director for technology at Christian & Timbers. "I guess it's just Management 101. CIOs are expected to keep track of their assets and pay for what they need." ◪

Tips for avoiding a software piracy complaint

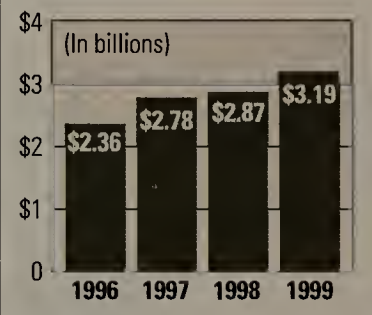
1. Set up a licensing compliance program. Put someone in charge and hold that person accountable.
2. Conduct software audits at least quarterly.
3. Centralize software purchases. Keep hard copies of licenses and receipts to prove ownership.
4. Buy extra licenses for each software package so you won't be caught short.
5. Establish software usage policies for employees. Many companies prohibit employees from installing software on their PCs.
6. Set up monitoring tools and discipline employees caught breaching policies.

If the BSA investigates your company, call your lawyers immediately. Treat it like a lawsuit.

Stolen goods

The software industry claims billions of dollars are lost to piracy each year.

Retail software revenue lost to piracy in U.S.



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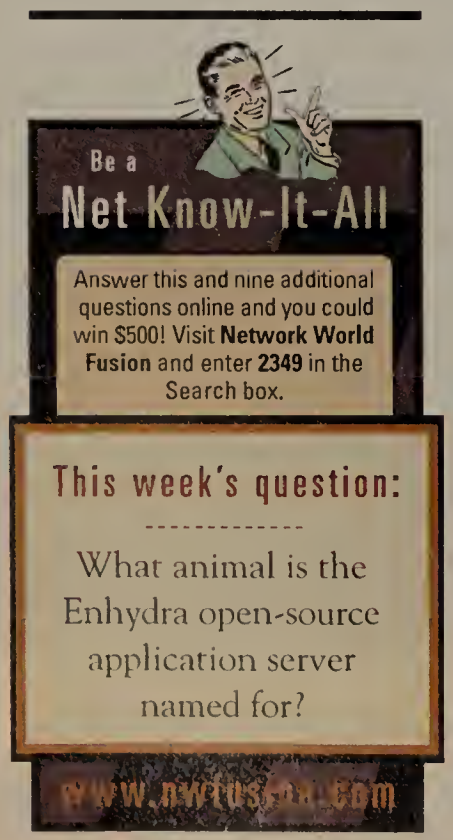

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Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

PureData recently announced six- and 12-port Gigabit Ethernet switches aimed at bringing Layer 3 hardware-based routing to network backbones in small and midsize networks. With optional T-1 and DSL WAN modules, the Layer 3 switches could be used to replace routers in small-business or remote enterprise branch offices.

The L6B and L12B offer six and 12 1000Base-SX and LX fiber ports, respectively. Each has a 64G-bit/sec backplane and forwarding rate of up to 20 million packet/sec. The L6B costs $7,000, and the L12B is priced at $10,000. Both products are available now.

Puredata: www.puredata.com

Procom Technology this week launched a network-attached storage (NAS) appliance for enterprise networks. The NetForce 3200C is a two-node cluster in which each NAS appliance will take over for the other in the event of a failure. The appliance contains up to 96 drives and uses Fibre Channel for connecting to back-end storage subsystems. The NetForce 3200C supports the Windows Common Internet File System, Unix's Network File System, as well as Access Control Lists and Windows NT's multiple master domain architecture. The NetForce 3200C cluster starts at $319,000 and is available now.

Procom: www.procom.com

Legato announced last week that its clustering software now works on storage-area networks. Legato wanCluster software, combined with QLogic host bus adapters and switches, forms a two-node active server cluster in which each server can support the other in the event of problems. WanCluster starts at $25,000 for a four-server implementation on Windows 2000.

Package takes PBX out of VoIP loop

BY PHIL HOCHMUTH

IQ NetSolutions will soon announce a line of distributed voice/data convergence products that could give customers a glimpse of a future without PBXs or call servers.

The IQ MediaPhone and VoIP (voice-over-IP) Gateway are aimed at small and midsize businesses that want to meld voice and data onto a single network, but don't want to deal with or pay for scaled-down PBXs or IP call servers and phones.

Instead of a central PBX or call server that provides call control, the system is based on IQ MediaPhones, which are deployed on users' desks and can plug into an analog or digital phone with a plain RJ-11 wire.

The MediaPhone, a device smaller than an analog modem, is used to connect PCs and phones to a network over a single network line. The MediaPhones recognize each other over the network through an autodetection process, which makes each device aware of who is on the network. The actual routing of calls is done between MediaPhones instead of a central PBX or server similar to peer-to-peer network technology such as Napster.

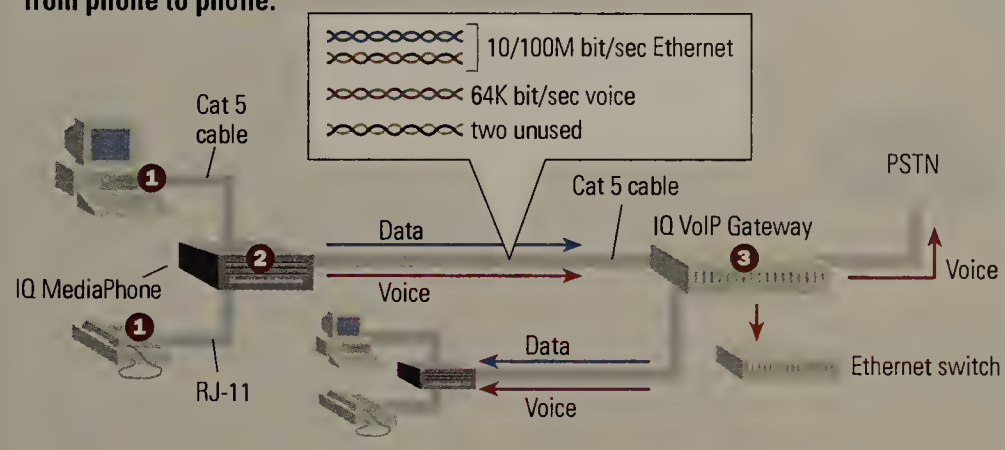
Unlike other convergence products, the MediaPhone does not packetize voice into Ethernet frames to send along with data down the same pipe. Instead, it uses one of the two unused twisted pairs of copper wire in a standard Category 5 10/100M bit/sec Ethernet cable to send 64K bit/sec of voice traffic. The MediaPhone packetizes the voice traffic and sends it using a proprietary protocol.

MediaPhones are attached to an IQ VoIP Gateway, which understands this protocol and does the actual voice switching. For data switching, each user port on the VoIP Gateway connects to an Ethernet switch port via a dedicated Cat 5 patch cable. The gateway also has trunks for connecting to the public switched telephone network

See **IQ NetSolutions**, page 20

The PBX-less, converged network

IQ NetSolutions' phone system has no central PBX or call server. It is based on IQ MediaPhones, which act as minirouters at each end station and provide call routing from phone to phone.



1 PC and a regular phone plug into the IQ MediaPhone, which connects to the network via one Category 5 cable.

2 The IQ MediaPhone packetizes the voice traffic and sends it down an unused twisted pair using a proprietary "IQ Protocol," similar to IP.

3 IQ Protocol voice packets are switched through an IQ VoIP Gateway, which also provides public switched telephone network access. Ethernet traffic goes through the gateway to an Ethernet switch to access the LAN.

CacheFlow looks to manage streaming media

BY JASON MESERVE

SUNNYVALE, CALIF. — CacheFlow last week beefed up its ability to handle streaming media files within its new cIQ Content Delivery family, which combines appliances and management tools for pushing files to the edge of a network.

Central to CacheFlow's new family is cIQ Director, an appliance for managing all HTTP, HTTPS, FTP and streaming content being handled by up to 100 Edge and Server Accelerator appliances. The one-rack-unit-sized device lets network professionals set policy for all the caching devices within a globally dispersed company or service provider network. It can be accessed by a stand-alone application or through Hewlett-Packard OpenView. Previously, management had to connect to individual devices or have local IT staffs set configurations for appliances on the premises.

"CIOs at headquarters can set policy for the caches to keep, prune or push content for all their global offices from one place," says William Hurley, program manager at The Yankee Group. "They don't have to dial into each device one by one."

The Director appliance sits in rack within the network and connects to Edge and Server Accelerators via the Internet or local IP network. Director can be used to set limits on how long a particular piece of content — be it a Web page or streaming media file — resides on an edge device. Managers can also use the system to see how many people are viewing particular bits of content. Also, schedules can be set to push content out to the caching devices during off-hours, when more bandwidth is available.

CacheFlow also announced it will

See **CacheFlow**, page 20

www.nwfusion.com
STREAMING RESEARCH
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Tolly on Technology . Kevin Tolly

State of the LAN: What Ethernet Can't Do

Sometimes the simplest questions are the best. On our last *Network World*/Tolly State of the LAN tour, a network manager in attendance said the following (and I paraphrase): "OK. Ethernet is great. There is huge hype surrounding it. We know what it is great at, but what are the things it cannot do?" Fair question.

Clearly, Ethernet-at-whatever-speed is not a panacea. There have been competing LAN technologies such as FDDI and token ring that had — at least at some point in time — some demonstrable benefits over the then-current Ethernet alternative. Having been buried by the Ethernet avalanche, any discussion of its benefits is largely academic. Given that the only real alternative to Ethernet is ATM — and only in certain situations — let's explicitly take that context and start with a little history.

During the past decade, Ethernet's architects — the members of the IEEE 802.3 group — have worked diligently at closing the gap between Ethernet and ATM. They've done an impressive job in an array of areas.

In the early to mid-'90s, Ethernet was an order of magnitude slower than ATM with 10M bit/sec Ethernet "competing" with OC-3 155M bit/sec ATM. Of course, raw speed has long since ceased being an issue with Gigabit, and soon 10-Gigabit Ethernet, providing more than ample bandwidth even for demanding metropolitan-area network applications.

The most significant — and successful — encroachment occurred when switched Ethernet devices appeared on the scene. This approach multiplies rather than divides bandwidth by the number of devices on the network and is the essential ingredient for building truly scalable networks.

These changes, along with the price benefits of using copper (because virtually all ATM connections were fiber) and avoidance of ATM's massive complexity, doomed ATM as the "end-to-end everywhere" solution it was long purported to be.

But, to return to our initial question, what Ethernet is not is a circuit-switched system. Yes, one can buy Ethernet switches and ATM switches but Ethernet uses switch packets and ATM uses switched circuits — that makes all the difference in the world.

In traditional Ethernet, there is no visibility beyond the packet once it passes through the port of the switch. Switches don't talk to each other and paths cannot be carved through the network.

So, the "quality of service" offered via Ethernet's 802.1p protocol really isn't that. It is actually a "class of service" mechanism — offering service that is relatively better than others but without any absolute guarantees. The Ethernet offering is not even in the same class as ATM.

Reconvergence and redundancy are other areas where Ethernet pales in comparison with ATM. By the time spanning tree reconverges, another ice age could begin. Again, various efforts within 802.3 — as well as proprietary vendor efforts — are under way or in place to mitigate this problem, but the lack of a "circuit-centric" approach makes the task daunting.

Bulking up connections by using parallel redundant links is possible with Ethernet these days but, although it is ruled by an 802.3 standard, it is still somewhat kludgy and limited by age-old Ethernet architectural issues.

I'd be remiss if I failed to remind you that the 802.3 standard still only recognizes a 1,522-byte frame as the largest chunk of data an Ethernet frame can transport.

This hasn't changed since 10M bit/sec Ethernet. Relative to the transport speed, this is like having the largest frame on 10M bit/sec Ethernet be 1.5 bytes.

Multi-protocol Label Switching, which will allow a circuitlike approach to packet switching, is where we need to look now. It is only by becoming more like a circuit-switched environment that Ethernet will be able to deliver advanced functions.

Tolly is chairman and CEO of Tolly Research. Tolly also is founder, president and CEO of The Tolly Group. He can be reached at ktolly@tolly.com.

Avaya brings cellphones, IP PBXs closer together

Software routes cable to mobile phones.

BY PHIL HOCHMUTH

WASHINGTON, D.C. — Avaya announced new software aimed at integrating users' mobile phones with the company's Eclips line of IP PBXs.

The EC500 Extension to Cellular is software for Avaya's call-processing software that allows end users to have calls to an office phone number automatically routed to a cellphone. The software also ties mobile phone users to Avaya's unified messaging software running on Eclips servers.

The company unveiled the software at the VoiceCon Conference 2001 last week.

The EC500 software runs the company's line of IP PBXs, including the Eclips IP600 Communications Server and R300 Remote Office Communicator. Avaya says the software will work with standards-based mobile phone services, such as Time Division Multiple Access, Code Division Multiple Access and GSM.

End users will be able to set up a single phone number that will ring a mobile and office phone simultaneously, the company says. Users talking on a mobile call will be able to pick up the phone conversation from their desk phone without transferring or interrupting the call, the company adds. Additionally, the software extends 10-digit caller ID information to a user's cellphone.

While the software cannot extend all PBX features to a user's cellphone, "it's better than having calls answered by voice mail," says Allan Sulkin, president of TEQ Consult Group. "If your main objective is to answer important calls, this will help solve that problem."

In addition to the software, DS-1 trunk modules are required for the Eclips server on which EC500 will be installed. Software licensing prices range between $155 and $230 per user. From April 2 to June 30, a 20-user license and two DS-1 trunk boards will be available for $8,178. Both the EC500 software and DS-1 modules are available now.

Avaya: www.avaya.com

IQ NetSolutions,
continued from page 17

(PSTN) and is compatible with H.323 and Session Initiation Protocol for communicating with other voice-over-IP gateways and IP PBXs over an IP net.

By putting voice on what is essentially a separate network from data traffic, voice-quality problems are eliminated, IQ NetSolutions executives say. But at the same time, both traffic types are traveling over the same wiring, eliminating the need for separate phone and data wiring.

Through a Web-based management application, network administrators can associate specific users' phone extensions and personal information with a specific MediaPhone for keeping a company phone directory. Because each user's data is tied to a MediaPhone, an individual can be relocated in an office without having to get a new phone extension.

"This system would be ideal for companies that don't have the capital or desire for a large centralized PBX or call server," says Tom Jenkins, a research director with the telecom consulting firm TeleChoice.

He says the company will probably find customers in smaller niche markets at first and not corporations, because the MediaPhone system supports less than 100 users and because its technology is unconventional.

Whatever businesses adopt the technology will probably do so for its supposed ease of installation, Jenkins says.

"The distributed nature and autoconfiguration are huge pluses to the system," Jenkins says.

A system including 14 IQ MediaPhones, a VoIP Gateway with 16 PSTN lines and a voice mail server costs $7,130. For larger offices, a system with 40 MediaPhones, a 10-line VoIP Gateway and voice mail server costs $17,740. The products will be available next month.

IQ NetSolutions: www.iqnetsolutions.com

CacheFlow,
continued from page 17

now support Windows Media and QuickTime streaming formats, in addition to RealNetworks content. Customers can now use the three most popular streaming formats for delivering on-demand content. For those wanting to conduct live broadcasts over a CacheFlow-enabled network, Windows Media is the only option at the moment.

CIQ Director will be available in March and starts at $14,995 for managing 10 nodes. The Windows Media streaming option can cost up to $7,500 extra depending on scale and whether the content will be on-demand or broadcast live.

CacheFlow: www.cacheflow.com

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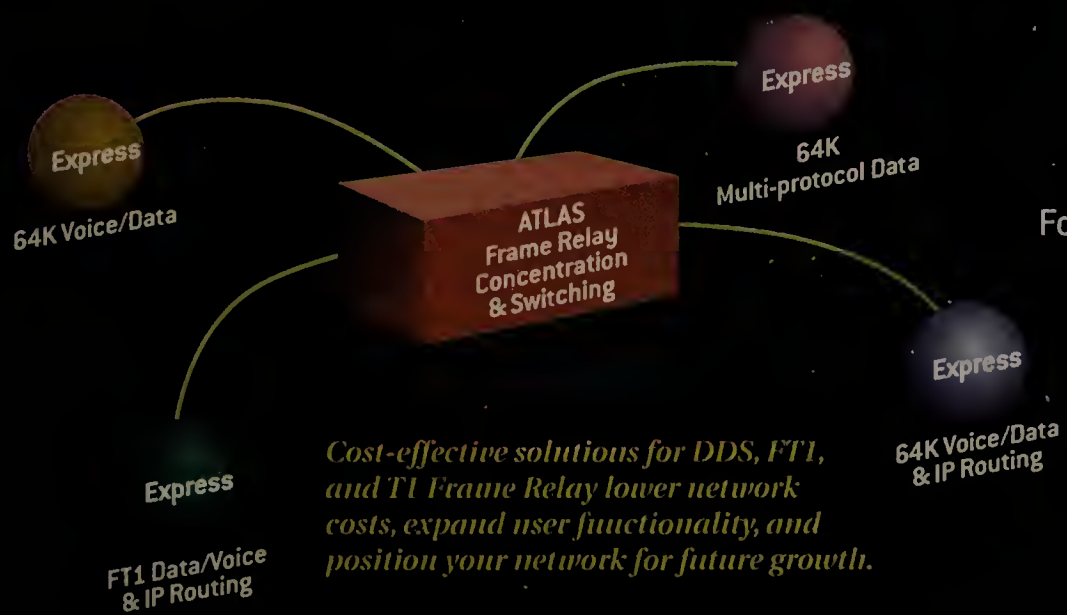

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Advanced server features on tap for 2001

BY APRIL JACOBS

SERVER FUTURES

Server vendors are building thinner boxes while adding management and pay-per-use features.

Users can expect thinner, faster servers in the coming year, with a smattering of new features and services designed to make installing, maintaining and paying for the new hardware more flexible.

Specifically, server vendors such as Hewlett-Packard, Sun, IBM, Compaq and Dell say they plan to bolster turnkey systems optimized for Internet data centers, offer power-saving servers that save on utility costs, and offer payment schemes that let users pay for only the CPUs they use.

For end users such as Geoff Ralston, vice president and general manager of the communications services group at Yahoo, critical system server features he'd like to see include integrated remote management for the manifold server farms that power Yahoo's Internet data centers. He'd also like to see platforms that let his developers more easily control the software that runs on those servers. Ralston says that's why Unix- and Linux-based servers, which offer stability and an open development environment, are so popular in today's Web and e-commerce infrastructure.

Last year Linux support came from big names such as IBM, Dell and Compaq, signaling the operating system's arrival at the enterprise door. IBM even touted Linux applications on its mainframes.

This year users will see more Linux-based server cluster technology. 2netFX and Linux Networx said they will offer users streaming media for Linux clustered computer systems. Linux Networx makes large-scale Linux cluster systems, including the Evolocityä 1240s, for users with Internet data centers.

Compaq is also committed to the Linux platform — it recently announced a joint technology agreement with SteelEye, which makes Linux cluster software. SteelEye also certified its LifeKeeper Version 3.1 cluster technology to run on Compaq's ProLiant family of servers. Turbolinux says it will start shipping Turbolinux Server 6 software for IBM's eServer z900 and S/390 mainframe computing platforms. IBM has made much of its ability to run Linux on its mainframes and has made about $1 billion in investments on the Linux front.

Server makers including Compaq, IBM and Sun are also focusing on users loyal to the Unix platform. Sun kicked off the new year with low-end Unix offerings aimed at users who like the reliability and upgradability of Unix-based systems. Those systems are expected to populate Web and e-commerce data centers.

Estimates by market research firm IDC showed that in 1999, worldwide server revenue was $61.4 billion, with Unix taking in $28 billion and Windows NT $11.9 billion. The numbers for 2000, which are not yet complete, don't look much different, IDC's Jean Bozman says.

A look ahead

What server makers are focusing on in 2001:

Service/support: Server makers are looking at ways to help companies cope with IT staff shortages. Dell plans to expand its service and support to help companies integrate its servers with software and operating systems.

Thin is in: Vendors will continue to shrink boxes, looking to decrease the amount of space servers take up in the data center.

Appliances: Server vendors will continue to pump out appliances that can off-load caching, management and security.

Do-it-yourself: Users will more often see servers within servers that can increase storage capacity on demand and control quality of service, with the idea of off-loading mundane or processor-intensive functions from the central CPU.

Smart servers: Companies such as Compaq and IBM are exploring ways to help users with server support. IBM has smart chips that can diagnose and, in some cases, even help correct errors, while Compaq is pushing tools that allow for better remote administration of servers.

Thin and easy

Vendors such as Compaq, IBM, Dell, Sun and HP will try this year to appeal to users who want thin servers and appliance devices. Basically, thin servers can be used to build server farms in small spaces — a requirement because most e-commerce and even corporate data centers are trying to save on the enormous costs of space associated with server buildout.

Appliance servers are a class of devices optimized to fit specific needs in corporate and e-commerce data centers. They come fully loaded with operating systems and often even application software designed to handle specific duties such as Web hosting or security. Cache, proxy, name and address servers are going to become an increasingly commonplace way of off-loading work from servers so they can handle more transactions.

This year vendors say they will focus on making those boxes thinner than ever and as simple to manage as possible.

At Dell, Gene Austin, vice president of worldwide marketing for enterprise servers, says the company is going to focus on honing the integration of applications on servers. "Our appliance business has been doubling every quarter since we came out last year, and one of the reasons is that customers can just turn it on and get it ready to do the job. That's very appealing, because they don't have a lot of people for installs," Austin says. He notes that "one of the biggest concerns our customers have is the shortage of IT staff."

In the way of thin servers, end users will see ever-thinner, less power-hungry machines available to them. RLX Technologies plans to offer a server that will break the traditional single-rack-unit measurement (1.75 inches) — now considered ultraslim — and eat up half the power of a normal server. Dell and Compaq say they are keeping an eye on that market, as well, but have no firm product rollouts.

Management

Of course, server management is an ongoing issue for users and one that server makers say they are trying to improve. IBM last year came out with a line of servers designed to do some self-diagnosis and fixes. All IBM's eServers now let customers monitor systems remotely and through Web-based reports. IBM also outfitted new servers with its Advanced Server Processor, which lets network managers manage a rack of 42 servers from a single remote connection. Its eSeries servers also feature Lightpath, a diagnostics tool that directs network managers to a compromised component either online or offline.

Compaq has steadily increased the number of features on its Remote Insight management software. One of the features the company will play up this year is the ability for users to remotely install operating systems on network servers. In data centers with hundreds of servers, the option could save days of labor.

Vendors are beginning to come out with programs that take into account, literally, the cash flow realities and usage peaks and valleys their users have. While pay-per-use schemes used to be part of the mainframe realm, the idea is moving down into nonmainframe ranks this year. Sun and HP already offer users pay-per-CPU options.

HP's LPR 1000 R, which debuted in late January, can be paid for on a "utility pricing" model for companies whose sites experience occasional spikes in traffic. In the utility pricing model, customers pay according to how often CPU and other resources are used. ◪

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PC Magazine Editors' Choice — Feb. 2000

Network World Blue Ribbon — Apr. 2000

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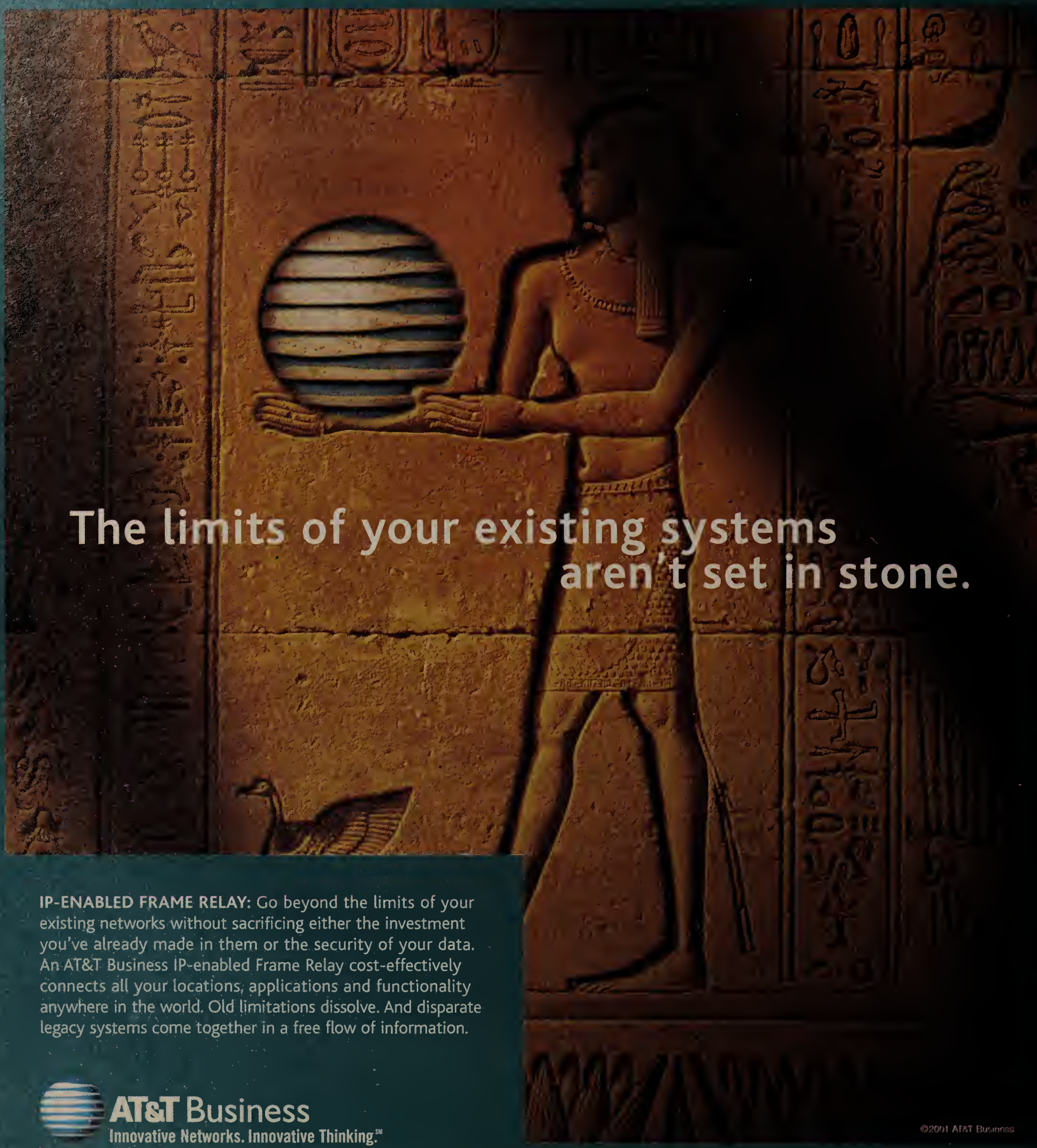

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Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

Venture funding may be tougher to find than reasonably priced Manhattan office space, but it's not impossible. Last week **GiantLoop Network,** a network and storage service provider, and **IntelliSpace,** a broadband access provider, closed funding rounds of $120 million and $60 million, respectively. GiantLoop's Series C round included contributions from Greylock Partners and Pilot House Ventures. IntelliSpace's Series B round was backed by firms including JPMorgan Partners, Weston Presidio and Cabletron Systems.

GiantLoop: www.giantloop.com; IntelliSpace: www.intellispace.net

Qwest Communications introduced its Local Broadband services in the Washington, D.C., and Baltimore markets last week. In addition to a variety of access speeds, Qwest Local Broadband offers Web site design, application hosting, LAN integration and long-distance services.

Pricing for the service starts at $79.95. Qwest now offers data local exchange carrier services in 13 markets and plans to be in 25 markets by year-end.

Qwest: www.qwest.com

Despite experiencing frequent installation and provisioning problems, users are signing up for DSL services in droves. According to industry consulting firm **TeleChoice,** there were 2.7 million DSL users at the end of last year in North America.

The report says 700,000 DSL orders were provisioned in the fourth quarter. TeleChoice says that the incumbent local exchange carriers maintain a leadership role with 78% of the market followed by competitive local exchange carriers with 21% and interexchange carriers with 1%.

ICA user-group conference in jeopardy

Traditional SuperComm participation out as group battles membership, attendance drain.

BY DAVID ROHDE

The nation's longest-standing telecom user group is struggling to find a home for its national convention, following a trend that has seen regional telecom user groups retrench or collapse.

Leaders of the International Communications Association are meeting this week in Washington, D.C., to decide how to replace ICA's traditional annual meeting held as part of SuperComm, a trade show for carriers.

ICA, which traditionally represents corporate users nationwide spending $1 million or more per year on carrier network services, has not been invited back to this year's SuperComm in June in Atlanta. Accounts differ as to why.

ICA First Vice President Ruth Michalecki notes that as SuperComm has expanded with the growth of the service provider equipment market, ICA's contribution to the show has appeared to shrink.

"I don't think we had as good attendance as we should have had last year," says Michalecki, who recently retired as telecommunications director at the University of Nebraska. "They decided they didn't have space for us this time."

An official with the International Engineering Consortium, which also participates in SuperComm, goes further, saying ICA's presence at SuperComm "kind of evaporated."

But Brian Moir, ICA's general counsel and long-time issues advocate before the Federal Communications Commission, insists that ICA members were dissatisfied with meeting at what is essentially a trade show for their own suppliers. Even so, SuperComm officials say attracting enterprise network managers is one of their goals. For the 2001 show, they have established their own enterprise track, called EntNet, in place of the ICA meeting.

The hunt for an ICA convention locale parallels a persistent membership drain. About 200 corporations belong to ICA, down from a peak of 600 to 700, according to Michalecki. The arrangement to share space with SuperComm, which began in 1995, was a retrenchment from what had previously been an independent ICA trade show.

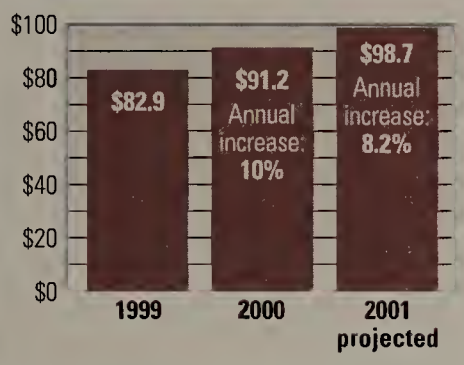
ICA's latest difficulties come soon after a disaster that hit a Northeast regional telecom user group called the Communications Managers Association (CMA). Last fall CMA was forced to can-

See **ICA**, page 28

Spending remains robust

Generic user groups may be falling on tough times, but end user spending on voice and data equipment continues to rise.

End user spending on voice and data equipment (In billions)



SOURCE: "2001 MultiMedia Telecommunications Market Review and Forecast," TIA

ISPs continue to improve Internet access SLAs

BY DENISE PAPPALARDO

The battle over ISP service-level agreements rages on as Cable & Wireless this week rolls out enhancements to its performance guarantees.

Cable & Wireless is beefing up its maximum allowable latency SLA for dedicated Internet access customers. The ISP now guarantees that dedicated Internet access customers will not experience more than 55 milliseconds of round-trip latency over its network.

The company's existing SLA promises 100% network availability and includes a guarantee that users will not sustain more than 1% packet loss.

Only new Cable & Wireless customers automatically get the stronger latency guarantee. Existing customers should contact their sales representative to amend their contracts to include the upgrade.

The Cable & Wireless offer trumps AT&T's SLA enhancement announced last month, which guarantees users will not experience more than 60 milliseconds of round-trip latency.

AT&T's SLA also guarantees that its network is 99.99% available, and that customers will not sustain more than .07% packet loss.

Users are hard-pressed to appreciate many of the SLA differences from top ISPs.

"Do latency and availability guarantees help me make a buying decision? Nope," says Geoffery Moon, CIO at Allied Coverage, a Jericho, N.Y., insurance brokerage. "Especially when all of the carriers are offering nearly identical packages."

See **SLAs**, page 28

SLA lowdown

AT&T is now leading the ISP pack when it comes to guarantees covering latency and packet loss. But UUNET is still leading on the network availability and proactive credit SLAs.

ISP	Latency	Packet loss	Network availability	Proactive credits
AT&T	60 msec.	.07%	99.99%	No
Cable & Wireless	55 msec.	1%	100%	No
Genuity	65 msec.	1%	99.7%	No
UUNET	65 msec.	1%	100%*	Yes

*Customers must notify UUNET within five days to receive a credit if its network is unavailable. Customers are automatically credited if UUNET does not meet its other two guarantees.

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Microsoft

Eye on the carriers . David Rohde

ARMSTRONG: A TYPICAL TELECOM CEO CRYBABY AFTER ALL

One day before the recent overhyped and rather meaningless fifth anniversary of the Telecommunications Act of 1996, AT&T CEO C. Michael Armstrong gave a speech before the National Press Club.

Armstrong absolutely blasted the regional Bell operating companies, saying they are out to "remonopolize" the local loop, overcharging competitors and users, stifling rivals wherever they appear, and crushing widows, orphans and small furry animals underfoot.

You can check out the text of the speech at www.nwfusion.com, DocFinder: 3038, but trust me, it was full of the same kind of demands on Congress and regulators to bear down now on the Bells that we've often heard from competitive local exchange carriers (CLEC) and consumer advocates.

It was so remarkable that Armstrong gave such a speech at all. The whole point of his acquisition-heavy makeover of AT&T — or so he used to say all the time — was to get AT&T out from having to rely on other, recalcitrant carriers to make user connections.

Starting in January 1998, Armstrong spent more than $100 billion of his shareholders' increasingly cheapened money to buy CLECs, cable companies and IBM's entire global data network. Yet, with the exception of a few defensive remarks about the cable market, Armstrong's speech reads exactly as if former AT&T CEO Bob Allen were giving it four years ago.

Not only did Armstrong endlessly whine about Bell pricing tricks and cutover delays, he threatened to pull out of New York and Texas for local telephone service unless the Bells shape up. He all but said he would never again try to provide a mass-market, all-distance service unless Congress and the Federal Communications Commission pass laws declaring Verizon and SBC Communications Public Enemies No. 1 and 2.

So Verizon and SBC are the scum of the earth. My question is, Mike, what did you do with the 100 billion bucks?

Here's the CEO of the nation's top cable television company, and all he could muster to say positive about that was this platitude: "The cable that runs into your home has the potential of carrying hundreds of TV channels, high-speed Internet and multiple telephone lines — all at the same time."

Potential? How does the nation's leading cable exec give a speech in the Internet age without once bragging about his actual high-speed Internet cable penetration?

Only once did Armstrong mention AT&T's passel of cable telephony customers, and that only reinforces how hung up AT&T is on the trench wars with the legacy Bells.

Maybe there's a logical explanation for that. This time next year Armstrong won't be the nation's leading cable executive, because he's spinning off the cable operation as part of his four-way breakup.

When he announced the breakup, Armstrong said he was "personally offended" by the suggestion that it was a reversal of his facilities-based bundling strategy. Well, running to Washington and proclaiming that the fate of his business now depends on politicians punishing his competitors shows just how deep that strategy reversal really is.

Rohde is managing editor of The Edge section of Network World. *He can be reached at drohde@nww.com.*

ICA,
continued from page 25

cel its annual convention after vendor booth sales plunged.

CMA recently reestablished a monthly seminar series in New York, and in a letter last month to members, CMA President Charlie Murray pleaded for patience as the group works out of a "financial crisis." A parallel West Coast user group called the Tele-Communications Association folded in the past two years, although some vertical-industry user groups — for universities, Wall Street shops and others — continue to thrive.

Critics maintain that the national and regional cross-industry user groups have been mired in a voice legacy and failed to replenish their predominantly telecom-manager ranks with executives responsible for a broader range of data and IP network services.

ICA's Michalecki says the group is still likely to come up with a meeting spot for the annual convention required under its bylaws, but educational sessions and attendance may be hurt by the lack of time to plan and advertise.

Promoting its conference

ICA's Web site at www.icanet.com promotes "ICA Conference 2001" but says the "program schedule is under development." A hypertext link to "be among the first to receive" a conference brochure is broken.

Founded in 1948, ICA made its mark by pressing the FCC for lower telecom rates and surcharges, principally by ordering reductions in local-carrier access charges built into long-distance tolls.

Moir says the group has not participated much in demanding a fix to recent rampant carrier provisioning delays, preferring to advocate better opportunities for competitive local exchange carriers. He says he's also recently been monitoring International Telecommunication Union meetings dealing with threats by member countries to impose restrictions on international packet telephony. ◪

www.nwfusion.com
GOING STRONG
Take a look at three single-carrier and vertical-industry telecom user groups achieving success despite the overall decline.
DocFinder 3031
find it online

SLAs,
continued from page 25

Which isn't to say SLAs don't matter.

"There is a big difference between 60 milliseconds and 120 milliseconds of round-trip latency when you're trying to support voice or video," says Robert Carlson, a senior analyst at consulting firm Current Analysis.

"But it's not that big of a deal when you're simply accessing the Internet," he adds.

It's the bottom line

The bottom line for users is often the bottom line.

"When an ISP violates an SLA, I want to know if it'll costs the carrier as much as it'll cost me. When the two are equal, that's when SLAs will really mean something," Moon says. "Until then, I think [SLAs] are just marketing gimmicks."

Nearly all ISPs offer one-day service credits if an SLA is not met. For example, an AT&T Managed Internet Service (MIS) customer will get a $66 credit if more than .07% of their packets are lost in one month. That credit is based on a $1,970 monthly service fee an MIS customer pays on a one-year contract for a dedicated T-1.

Genuity offers customers a slightly stronger credit. The ISP offers a three-day credit if its network is unavailable for more than 60 minutes during one instance.

Each ISP has a ceiling on the amount of credits it will issue each month, but these ceilings vary. Cable & Wireless will credit customers up to seven days' worth of service per month. AT&T will credit customers as long as the credits do not exceed that month's service fee.

> ***"Do latency and availability guarantees help me make a buying decision? Nope."***
>
> Geoffrey Moon, CIO, Allied Coverage

In addition to performance SLAs, users want assurances on mean time to repair and installation times, Carlson says.

"We're looking for a degree of responsiveness," says Rich Gay, IS director at Linbeck Construction in Houston.

"Latency guarantees are more meaningful than some of the other SLAs, but I want to know how quickly my carrier can fix an outage," he adds.

Cable & Wireless is one of only a few ISPs that guarantee it will fix a network outage within 10 minutes. If this SLA isn't met, a customer gets a one-day service credit.

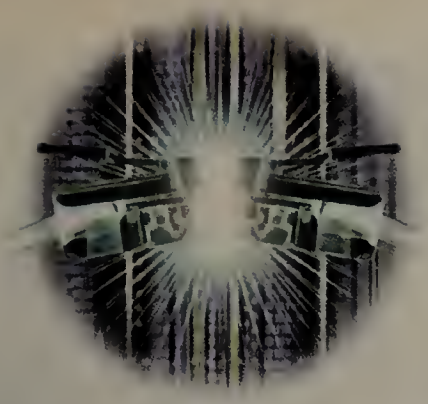
AT&T is offering an installation guarantee as part of its standard SLA. The carrier guarantees that MIS customers will have a dedicated T-1 line installed within 32 business days, a dedicated T-3 within 42 business days and an OC-3 within 63 business days. If AT&T misses any of these installation windows, a customer does not have to pay the installation fee of $1,000, $5,000 and $10,000, respectively.

"Anyone who has the guts to put in an installation guarantee has to be commended," Carlson says. "Most providers are having trouble dealing with the local access services providers."

Intermedia and UUNET also offer comparable installation SLAs.

More ISPs are also covering a customer's local-loop connection under standard SLA offerings. AT&T, Genuity and UUNET include the local loop, but with stipulations.

AT&T's guarantee only covers customers that subscribe to AT&T's managed router Internet access service called MIS. Genuity and UUNET will only cover customers that order their local-loop connection through the ISP. ◪



The Edge

Service provider developments at the juncture between the enterprise and the new public network

Briefs

Long-haul optical vendor **Corvis** says one of its carrier customers, wholesaler **Williams Communications,** achieved a 10G bit/sec transmission without amplification over a distance of 6,400 kilometers, a new record.

Williams Communications has a $300 million agreement with Corvis to supply optical gear with a view toward providing optical VPNs, wavelength leasing and wavelength protection and restoration.

Corvis: www.corvis.com

CopperCom, a maker of softswitches and integrated access devices (IAD) supporting voice over DSL, says it has adopted a new ATM standard that will make it easier for DSL service providers to wheel out packaged voice and data services.

The company says its MRX IADs as well as its CopperCom Gateway packet switch support Embedded Operations Channel, an ATM Forum standard for a management link between service provider switches and gear that is installed at customer sites.

CopperCom: www.coppercom.com

Rochester, N.Y., company **Performance Technologies** has announced Segway, a Signaling System 7/IP interworking device that lets wireless and wireline operators off-load long-haul traffic currently carried over costly, dedicated SS7 links to lower-cost IP networks.

Segway devices are in field trials with service providers including Comfone, a Swiss GSM roaming service enabler, and are slated to begin shipping in the second quarter, according to the company.

Performance Technologies: www.pt.com

MPLS boosts integrated access gear

Start-up Integral Access attracts CLECs shunning TDM, ATM for voice/data services.

BY DAVID ROHDE

A carrier and premises equipment start-up is employing Multi-protocol Label Switching to find a niche among new local carriers which want to sell voice and data over IP.

Like numerous other vendors, the start-up, called Integral Access, pairs access aggregation gear for service provider points of presence with a diverse set of integrated access devices (IAD) for the customer premises.

But the trick for Integral Access is that all its devices support MPLS, a traffic-engineering technique for IP networks that's become increasingly popular in large carrier switches but is still comparatively rare in integrated access gear.

MPLS separates forwarding information from IP headers to create multiple VPNs — each distinguished by the application's sensitivity to latency or other network performance factors.

Integral's flagship product is the PurePacket Node, a chassis-based multiservice access concentrator for central offices, collocation sites and common wiring closets. The PurePacket Node combines the functions of an IP voice gateway, digital cross-connect and SONET multiplexer.

Integral Access' 18-slot Pure Packet Node sits in carrier POPs and communicates with integrated access devices on customer premises via MPLS.

For the customer premises, Integral offers the PurePacket Outburst-SB, suitable for a site with a single T-1 access line. Using dynamic bandwidth allocation of the voice and data packets, the device can deliver 24 simultaneous voice calls plus up to 500K bit/sec of data over the T-1. It also provides key IP routing capabilities such as network address translation and acts as a Dynamic Host Configuration Protocol server.

Integral also offers a

See **MPLS**, page 32

Cisco rolls out Long Reach Ethernet products

BY JIM DUFFY

SAN JOSE — Cisco last week unveiled products that let users extend Ethernet up to 5,000 feet over existing voice-grade copper cabling.

The products are aimed at the burgeoning broadband multitenant building market in which landlords can act as service provisioning brokers by offering high-speed Internet access to tenants or guests as part of their lease or length-of-stay agreement.

The products can also be used in factories, healthcare facilities and schools where rewiring with fiber or higher quality copper would be cost-prohibitive.

The new products include two switches, a customer premises equipment (CPE) device to connect phones and computers to telephone wiring, and a splitter for separating voice and data traffic from the same wire. The products also include a Windows NT server running subscriber management software obtained from Cisco's acquisition of the broadband subscriber management business of CAIS Software Solutions last year.

The products use Cisco's Long Reach Ethernet (LRE) technology, which pumps Ethernet over very-high bit rate DSL on Category 1, 2 and 3 single-pair copper wiring. LRE can achieve rates from 5M to 15M bit/sec at distances up to 5,000 feet, Cisco says.

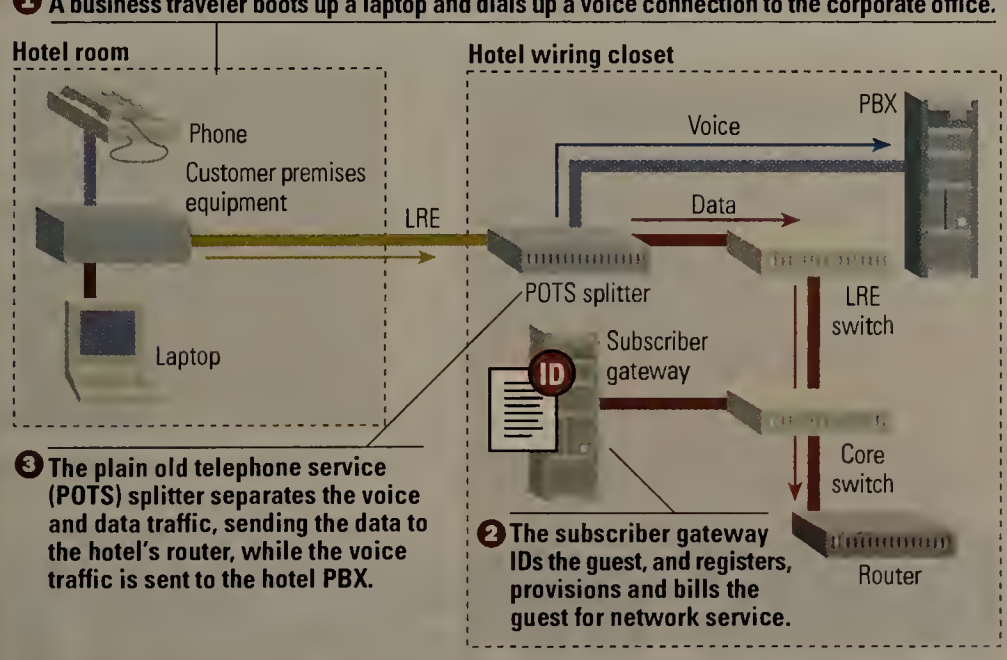
It also lets voice and data share the same wire, the company says. The upshot is LRE lets users extend Ethernet over long distances without the expense and disruption of pulling new fiber or Category 5 copper cabling, Cisco says.

The switches are the Catalyst LRE XL and the 2912 LRE XL. They sport 24 and 12 RJ-21 ports, respectively, as well as four

See **Cisco**, page 32

Reaching out

Cisco is using very-high bit rate DSL technology as the basis for its Long Reach Ethernet (LRE) offering, which extends the technology up to 5,000 feet over existing voice-grade wiring.



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Accordion pushes intelligence to the network edge

BY MICHAEL MARTIN

FREMONT, CALIF. — Start-up Accordion Networks last week took the wraps off OnsitePOP, a broadband services platform designed to let service providers serve up bandwidth-intensive applications over very-high bit rate DSL.

Accordion's goal is to improve application performance through a combination of Layer 3 switching and quality-of-service (QoS) features at the edge of the carrier/enterprise network, says Rajan Aiyer, Accordion co-founder and vice president of marketing.

OnsitePOP consists of the Onsite Service Gateway 6000, a switch that sits at a campus, building or metropolitan point of presence; the Onsite Service Gateway 100, an access device that sits in a customer's premises; and the OnsiteEMS Element and Service Management System, which lets providers remotely manage services offered over the gateways.

The heart of OnsitePOP is the OSG 6000 Layer 3 switch. The OSG 6000 is chassis-based with 14 slots that provides up to 72 subscriber ports with redundancy. The switch simultaneously supports cell, packet and time-division multiplexer processing over a 30G bit/sec crossbar switching fabric.

The 6000 has ATM QoS features and can run IP over ATM.

The line cards for the 6000 are called WarpRun Line Cards. The cards come with six or 12 VDSL ports. WAN cards for the 6000 include DS-3 ATM, 8 x T-1 ATM and Gigabit Ethernet. The line cards can drive 26M bit/sec up to 1,500 feet over copper and 100M bit/sec over fiber.

The OSG 100 tenant device supports a range of voice and high-speed data combinations, ranging from 16 plain old telephone service lines with high-speed data to one T-1 voice line with high-speed data. The box has four priority queues and eight classes of traffic to enable IP QoS.

In addition to providing the infrastructure to let service providers roll out applications to customers, Accordion will work with providers to hook Web-enabled end-user ordering software to back-office systems.

Aiyer says this would let customers activate services without involving the service provider.

"Using this, the service provider could offer services when and if the customer needs it," he says. For example, a customer could set up a VPN for a day and take it down after the session.

Amy Helland, an analyst with Cahners In-Stat Group, believes Accordion will fill a need in the service provider market by providing a more application-aware infrastructure.

"Service providers need to offer higher level content, like videoconferencing, and to get that the QoS needs to be there," she says. "Accordion could appeal to existing service providers that have systems that don't meet the needs for higher-end applications and to new providers looking to deploy an infrastructure that gives them more control."

Curt Wheeling, CTO of integrated communications provider Advanced Telecom in Santa Rosa, Calif., says he likes the idea of deploying an intelligent in-building controller to his firm's multitenant user customers.

Advanced Telecom is lab testing the OnsitePOP and plans to deploy it later this year. The company also works with other integrated access device vendors.

"Accordion gives us a lot of opportunity to offer higher end applications," he says. "We like the high bandwidth between the controller and the end-user device."

OnsitePOP is slated to ship in the second quarter. The OSG 6000 starts at $29,995, the OSG 100 starts at $2,995 and OnsiteEMS starts at $7,995.

Accordion: www.accordionnetworks.com

PROFILE: ACCORDION NETWORKS

CEO Gautam Chanda

Location:	Fremont, Calif.
Founded:	1999
Service:	On-site POP broadband multiservices activation platform.
CEO:	Guatam Chanda
Financing:	$20 million from investors including Crescendo Partners, Accel Partners, Texas Pacific Group and Intel.
Employees:	80-plus
Fun fact:	Accordion got its name when Chanda and co-founder Rajan Aiyer met in a restaurant to discuss the concept for a flexible company with expandable technology. In the back was a glass-encased accordion with a sign: "In case of emergency, save the accordion."

MPLS,
continued from page 29

smaller IAD called the Outburst-Vx and a data-only device called the Outburst-Dx. Those boxes are suitable for DSL and multiple dial-up access lines.

Integral's approach appeals to Westelcom, a competitive local exchange carrier (CLEC) in Plattsburgh, N.Y. The CLEC is installing PurePacket Node in one of its central offices — the company is actually a subsidiary of a local, non-Bell incumbent telephone company — and collocating them in four Verizon central offices for expanded geographic reach.

Westelcom will install the IADs on customer premises to offer a variety of services, from a mixed voice/data offering for business T-1 customers to a residential service combining 384K bit/sec Internet access with two ordinary phone lines.

Westelcom Corporate Engineer Eric Kreckel says the CLEC didn't want to base new integrated services around the variety of available IADs based on time-division multiplexing. But he also passed on newer ATM-based IADs and carrier access concentrators that turn IP applications into cells and transport them via ATM's standard classes of service.

The problem with ATM is the network efficiency for small offices and residential customers. "Once you get through the IP encapsulation and the ATM cell tax, you're transporting more header than data," he says.

Integral has also sold into a group of CLECs in Minnesota, including Jaguar Communications and HickoryTech.

One key for IAD vendors to appealing to these CLECs, says RHK analyst Claude Romans, is building interfaces from the aggregation gear to classic Class 5 telephone switches and newer softswitches. Integral didn't initially support classic telephone company switches, he says, but eventually added support for the GR303 protocol for voice concentration typically used by these devices.

Indeed, Kreckel says GR303 support was important for Westelcom. ◪

Cisco,
continued from page 29

10/100M bit/sec RJ-45 Ethernet ports. These switches connect to servers, such as the NT subscriber management server acquired from CAIS; to Cisco's new plain old telephone service (POTS) splitters; and to other Catalyst switches, such as those used for Ethernet aggregation, in a building's main wiring closet.

The switches support speeds of 5M bit/sec up to 5,000 feet, 10M bit/sec up to 4,000 feet and 15M bit/sec up to 3,500 feet.

"We can finally affect a 10M bit/sec connection to any hotel room regardless of the topology of the wiring architecture," says Jim Thompson, CTO at Wayport, an Austin, Texas, service provider for the hospitality industry. "About two-thirds of the hotel plant out there tends to have unrated or nonnetwork [capable] cabling."

The CPE device is called the Cisco 575 CPE, and it functions like a DSL modem. It sits on a desktop next to a phone and computer and sports two RJ-11 ports for line input and telephone, and a single RJ-45 for a 10/100 Ethernet connection. The CPE lets users dial into the Internet from their laptops and into the public switched telephone network to conduct simultaneous voice and data calls on the same wire.

The POTS splitter is called the Cisco LRE 48. It provides connectivity between the LRE switches and a building's PBX. It sports 48 ports for aggregating 575 CPE links and six RJ-21 ports — two each for connectivity to a patch panel, Catalyst 2900 LRE XL switches and an on-site PBX. The POTS splitter takes up one rack unit in a wiring closet.

The NT server running CAIS Software's IPORT software is not a new product. Cisco says there are 1,200 to 1,300 installations out there.

But the company renamed it the Cisco Building Broadband Service Manager (BBSM) after closing the CAIS acquisition early last week.

BBSM registers and provisions network service based on the guest or tenant profile. It offers bandwidth throttling for efficiency and congestion avoidance, a Web portal for local service, content and advertising specific to the guest, tenant or organization, and integration with hotel billing systems for network usage chargebacks.

Still, Wayport's Thompson says Cisco's LRE offering is a little expensive. "As with all things, I think the pricing has to come down a little bit," he says.

The LRE XL switches cost $6,495 for the 24-port version and $3,295 for the 12-port model. The CPE devices cost $280, and the POTS splitter costs $1,395. All products will ship in April. ◪

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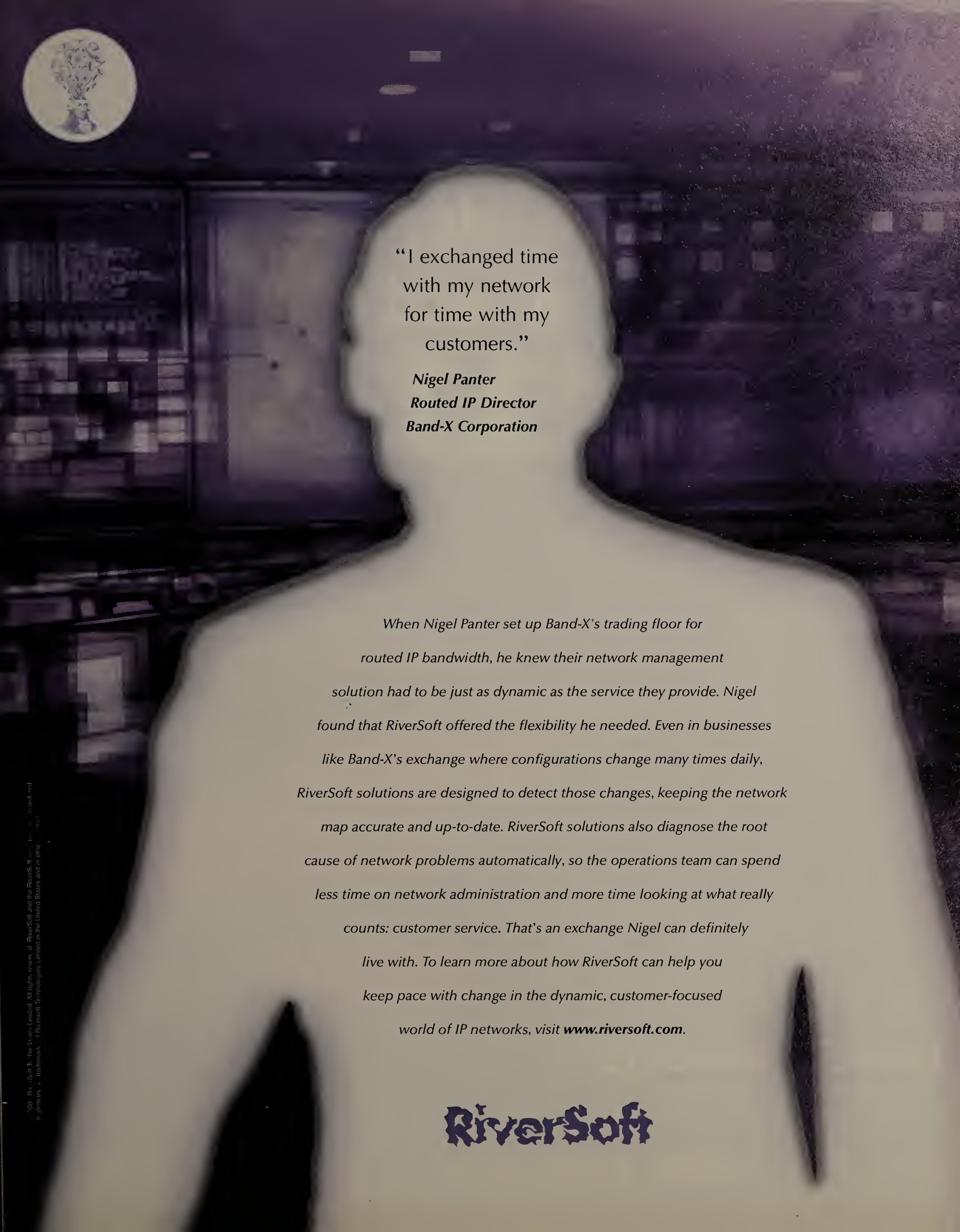

When Nigel Panter set up Band-X's trading floor for routed IP bandwidth, he knew their network management solution had to be just as dynamic as the service they provide. Nigel found that RiverSoft offered the flexibility he needed. Even in businesses like Band-X's exchange where configurations change many times daily, RiverSoft solutions are designed to detect those changes, keeping the network map accurate and up-to-date. RiverSoft solutions also diagnose the root cause of network problems automatically, so the operations team can spend less time on network administration and more time looking at what really counts: customer service. That's an exchange Nigel can definitely live with. To learn more about how RiverSoft can help you keep pace with change in the dynamic, customer-focused world of IP networks, visit ***www.riversoft.com****.*

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Briefs

IBM has launched its iSeries Connect software, which lets small and midsize companies link their businesses to online marketplaces and partners. ISeries Connect is built on Sun's Java and XML, and is designed to run on systems used for e-commerce, such as IBM's WebSphere and Lotus Domino. The software, which works with IBM's eServer line of systems, offers connectivity and catalog tools, and lets users add features to the software. Customers using it can establish secure, direct connections with business partners and online exchanges, IBM says. Also included in the package is IBM's MQSeries middleware, which provides messaging features. ISeries Connect pricing starts at $1,000.

IBM: www.ibm.com

Motive Communications last week announced online applications for companies that need to support mobile users for online trading and banking. Motive's Mobile Customer Care is an extension to Motive 4.0 software, which is used by Merrill Lynch, Wells Fargo and other large companies to support users of PCs, servers and Web-based applications. Now these firms can support users of PocketPCs, Palm devices, BlackBerries and Web-enabled phones with the same back-end, help-desk software. Mobile Customer Care features browser-based software that lets users of mobile devices access context-sensitive help, chat with experts and synchronize their devices with PCs. The suite will be available at the end of March and will be sold for an annual fee, depending on the number of users. A typical company spends $500,000 per year on Motive's suite of e-support software and services. Mobile support will add around $100,000 to that fee.

Motive: www.motive.com

RightWorks aims to exploit e-biz

President Jeff Carr says company has plenty to differentiate it from rivals.

NetworkWorld Q&A

RightWorks President Jeff Carr has big plans for the San Jose provider of e-procurement and business exchange software, which later this month plans to air Version 7.0 of its software and later this year might even brave the IPO waters if they get any friendlier. Carr and the rest of the team leading RightWorks' 400-person operation also aim to make the company one of the top two or three players in what he describes as a wide-open e-business software market. Carr spoke recently with Network World *Executive News Editor Bob Brown.*

Ariba CEO Keith Krach recently told me that his company doesn't see much of RightWorks in the field. Are you surprised he'd say that?

His sales organization clearly knows who we are. One of the things this [observation] points out is that Ariba, Oracle, Commerce One and i2 all tend to migrate to the extreme high end of the marketplace. While we would not mind winning one or two of the big, high-publicity global exchanges, we're focused on the rest of the market — private exchanges and, to some extent, the small and medium enterprise marketplace. . . . Those big public exchange deals just suck the life force out of you in terms of resources.

Jeff Carr, president of RightWorks, says his firm hopes to tap a wide-open e-business marketplace.

What's your take on the state of the public e-marketplace industry?

These public marketplaces have dozens of challenges. Covisint [the automotive industry exchange], for example, is still looking for a CEO. When you pull businesses together that have traditionally competed, they want to share some data, but in terms of getting real traction in many cases, they're just up against a major uphill climb. Some will be successful just by sheer force of will. Meanwhile, a lot of companies that join these exchanges are still looking to build one or more private exchanges.

And that's where RightWorks comes in?

Any time we see an announcement of a public marketplace, we do two things. We go to each member of that exchange and look for an opportunity for a private marketplace that we could help them get up in a matter of months so they could show internal management a quick set of results. The other thing we do is approach the industry players that have not joined the public exchanges.

How does RightWorks' business break down?

We're at a 60%/40% zone in terms of business from e-procurement inside the firewall vs. marketplace/exchange/outside-the-firewall type of opportunities. That's a shift from 60%/40% the other way from last summer. We've also migrated much more to the Global 2000 from the dot-coms and market makers.

How does RightWorks differentiate its offerings from those of competitors?

We have an application on a single data model that offers procurement, marketplace, content and auction capabilities. Our competitors went public and took their market caps and did acquisitions. In a lot of cases they are focusing on integration and taking multiple code lines, data models, [graphical user interfaces] and architectures and trying to [blend] them. When customers start with us, whether they choose to start with a marketplace, private exchange or procurement, they can readily implement the other applications and use a lot of what they've already populated in terms

See **Carr**, page 38

Tally ropes in PDA management

Software will let users inventory and track devices.

BY JOHN FONTANA

PDAs are multiplying like rabbits in the enterprise, and network administrators are beginning to look for ways to manage the trendy creatures.

Tally Systems recently released a module for its TS.Census asset management software that can identify PCs that have PDA synchronization software installed. The software lets network administrators get a handle on who is using the devices.

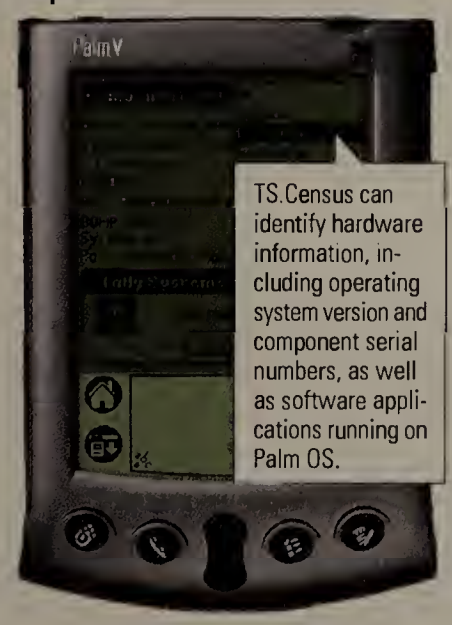
Asset management is a technology that helps IT organizations accurately inventory their hardware and software assets, as well as track those assets through their life cycle.

In June, Tally will add a module that automatically installs on a PDA and allows TS.Census to track make and model, and record configuration data and installed applications. The initial software will only work with PDAs running Palm OS, but Tally plans to support other devices such as BlackBerries and Windows PocketPCs

See **Tally**, page 38

Palm reading

Tally Systems has released asset management software that helps IT administrators track PDAs used in the corporation.



TS.Census can identify hardware information, including operating system version and component serial numbers, as well as software applications running on Palm OS.

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AN UNHEALTHY TENSION

Congress held a hearing on the Internet on Feb. 8. Such a hearing is hardly a unique occurrence, but in this case, it is symptomatic of a growing problem.

This particular hearing was held by the House Telecommunications Subcommittee and was in response to the creation of new top-level Internet domains by the Internet Corporation for Assigned Names and Numbers (ICANN).

As an aside, the press coverage on this demonstrates why the press is held in such high regard — not! *The Wall Street Journal* called ICANN "the Internet Council for assigned Names and Numbers" and The *New York Times* insists, in an example of its "we know better than you" attitude, on spelling ICANN as "Icann."

The problem with this hearing is that ICANN was specifically set up as a nongovernmental way to manage some of the mostly technical aspects of the Internet. ICANN's board members are from around the world, and its mandate is international. The Internet that ICANN deals with is international.

Yet the U.S. Congress, and other parts of the U.S. government, insists on treating the Internet and ICANN as being under U.S. jurisdiction. I don't want to debate ICANN's virtues or lack of them but I am worried about the example being set and the attitude being legitimized.

The U.S. Congress holding this hearing is no better than a French court forcing Yahoo to censor what material it offers over the Internet or an Italian court claiming jurisdiction over the entire Internet, both of which have happened in the past few months.

It's one thing for a country to tell its citizens they are not permitted to go, for example, to the CNN Web site because it includes information that disagrees with some government position, and to try to block access to the site by insisting that filters be placed on its international Internet links. It's altogether something different to claim that a government has the right to force CNN to close down when the CNN Web site is not in that government's country.

The Wall Street Journal says Congress is "unlikely to reverse ICANN Internet names." Based on the reports, some House members clearly think they could if they wanted to. Because ICANN is based in the U.S., I expect that these Congressmen could force ICANN to capitulate. But it would be extraordinarily shortsighted for Congress to do such a thing.

The U.S. Congress would just show the rest of the world that an individual country should be able to claim authority over the Internet. Having 280 countries follow this lead and pass conflicting regulations would be very bad for anyone trying to use or do business on the Internet. That's a tension we can do without. The best example that Congress can set is to keep its hands off.

Disclaimer: Luckily, Harvard does not have much salutatory authority because some Harvard people would otherwise exercise it. But the above suggestion is mine, not Harvard's.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

Breakaway goes mobile

BY JENNIFER MEARS

BOSTON — Breakaway Solutions, an application service provider with infrastructure, hosted software and professional services products, is adding another component to its repertoire — it's going mobile.

This week Breakaway announced an alliance with iConverse, a wireless software maker that integrates enterprise applications using a platform that is based on open technology such as XML and Java.

Using the iConverse platform users can quickly migrate applications into a wireless environment that can be accessed by myriad mobile devices, says Niraj Jetly, practice director of mBusiness Solutions for Breakaway.

"We can do one-time development, and all the devices you can think of . . . are supported," he says.

Ron Matros, CEO of iConverse, says applications are modified using drag-and-drop technology that lets users preview how the application will appear on different devices and alter them as they choose.

Jetly says Breakaway is adding the mobile service because it believes Palms, Wireless Application Protocol-enabled mobile phones and handheld computer users will need to access corporate apps.

Art Williams, an analyst with Giga Information Group, says while the wireless market isn't growing as quickly in the U.S. as it is in Europe and Asia, he agrees users may want to access messaging applications such as e-mail while on the go.

"Breakaway is ahead of the curve on this," he says.

The ASP Industry Consortium, meanwhile, has formed a wireless subcommittee to focus on the mobile issue. Jim O'Reilly, the consortium's spokesman, says the wireless ASP market is expected to grow to more than $3 billion in the next few years.

He notes, however, that the subcommittee is based in Europe, where the wireless industry is leaps and bounds ahead of the U.S.

Breakaway Solutions: www.breakawaysolutions.com; iConverse: www.iconverse.com; ASP Industry Consortium: www.aspindustry.org

Wireless

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Tally,
continued from page 35

and Pocket CEs.

"One of the big questions in the enterprise is why should we manage these devices," says Patricia Adams, a Gartner Group analyst. "But as the intelligence and storage of these devices has increased, it has fueled the argument for managing them."

She says employees can easily leave companies with customer or phone lists on their PDAs. "That is corporate data that should not be leaving with former employees," she says. Adams says several other asset inventory vendors, which she declined to identify, are planning to make similar announcements about managing the growing glut of PDA devices in firms.

Other players in asset management include Microsoft, Peregrine, MainControl and Tangram.

The surge is fueled by the fact that mobile devices will outnumber PCs within the next two years, experts say. Gartner Group predicts that by 2004, 60% of office productivity workers will carry at least three mobile computers. Also, industry giants Hewlett-Packard, IBM, Microsoft, Oracle and Sun are developing Internet-based platforms to deliver "Web services" that feature mobile devices as a key entry point to the network.

Tally isn't wasting time offering management capabilities. The TS.Census agent that runs on PCs features the ability to identify PDA synchronization software from vendors such as Palm, Puma Technology and 3Com. Eventually, the agent will be able to spawn a smaller agent that will reside on PDAs and send data back to the TS.Census asset database.

"We find that many customers are at the initial decision point on how to manage these devices and that is why we are taking this first step," says Joanne Egner, director of product management for Tally.

The PDA synchronization software is free to current TS.Census users. For new users, the client/server edition of TS.Census costs $22 per PC per 1,000 nodes. The desktop model, which doesn't require a database on the back end, is $18.50 per desktop.

Tally: www.tallysystems.com

Carr,
continued from page 35

of definitions, business rules and workflow.

With public companies such as Ariba and Commerce One having established themselves as the leaders in the business-to-business software market, how can RightWorks crash the party?

Krach says 93% of the Global 2000 has not made a procurement decision. But only a small percentage of those organizations have built out a private exchange. So we do think the market is very open, especially in the area of e-procurement.

Where do you most often see customers going wrong when building exchanges?

Customers tend to bring an application in and immediately tailor it to meet business requirements or a real or perceived gap. A lot of people in the [business-to-business] industry have felt that some of the other players have had a sort of land-grab mentality and were just out there planting flags at customer sites and issuing press releases. We encourage customers to go with our three-step methodology that emphasizes getting the system up and operating in eight to 10 weeks, showing quick results and getting the management team's commitment. ◪

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mobile business

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- **Active Directory vs. Novell Directory Services**
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NEXT LIVE WEBCAST

- **Voice-Over-IP:** *Can it live up to the hype?* *March 9, 2001*

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass

My company is leaning toward purchasing Cisco's 65XX product for its core switch in our home office. Before we make a final decision, we want to review third-party product comparisons. Do you know where we can find comparisons?

Try searching for "network equipment test results" from a search engine. If you have specific products in mind you can search for documents containing all the relevant vendor names to gather test results and product comparisons. The site www.nwfusion.com provides product information and at least one recent discussion forum dealing with the Cisco 65XX series products. The site www.tolly.com also is an excellent source for information.

For experiential information from the field, become familiar with the resources and mailing lists available from http://puck.ether.net/lists, www.nanog.org/resources, www.myengineer.com, www.etestinglabs.com and the sites of the vendors you're considering. Almost every vendor site has a link that points to press items mentioning its products. These links can lead to white papers and reports that often include respectable third-party testing.

Also, encourage your network and systems administrators to participate in local professional organizations to stay current with the experiences of their peers. There are also comparison reviews available from industry research firms, often for a fee.

Blass, a network architect at change@work in Houston, can be reached at dr.intranet@changeatwork.com.

Layered biometric tools boost security

BY JOE BENADO

In the race to improve security infrastructures faster than hackers can invent methods to penetrate firewalls, it is important to ascertain a user's identity before permitting access to protected data. Given the pervasive use of passwords and personal identification number codes for user authentication across all aspects of our daily life, attackers have developed powerful password-cracking tools.

New technologies that aim to directly strengthen user authentication include the use of tokens and smart cards combined with digital certificates. The most compelling and intriguing authentication technologies involve biometrics matching — the measurement of physical and behavioral characteristics such as facial structures, voice patterns and fingerprints.

In the past few years, biometrics technology has rapidly pushed through barriers that have slowed its adoption in mainstream environments. Performance, accuracy and reliability have increased among all types of biometrics methods, and prices for capture devices have plunged, making biometrics an attractive addition to security systems. The remaining challenge for biometrics is to address the requirements for large-scale deployments in complex governmental, institutional and commercial systems.

To gain widespread acceptance in businesses, multiple individual biometrics methods must coexist in a single system solution, and the underlying architecture must better support conditions of interoperability, scalability and adaptability that govern total cost of ownership calculations. A multitiered authentication system built around these notions is one solution.

At the center of the authentication system, a server orchestrates interaction among clients devices, an authentication validation policy system, multiple authentication matching engines and databases housing user information. Applications and transaction systems request a centralized authentication server to confirm or deny a user's identity. The server receives incoming requests for authentication and directs actions to gather appropriate user credentials and evaluate them against a set of validation criteria.

The policy system might maintain extensive rules to meet security requirements that may differ depending on the user, application or transaction task.

The authentication security policy may require many biometrics for validation. Thus, the validation system must be able to layer biometrics approaches, balance matching scores from each matching process and interpret these results in light of preset policies. This process is computationally expensive. It's critical that companies scale with system demand. Because each biometrics method requires a different matching process engine, the authentication system should distribute the matching task to the correct algorithm and thread the processes across a farm of processors.

The user-interaction tier collects credentials from live users in real time. To collect a new biometric sample, a prompting system must request a specific user action, such as presenting a particular finger for scanning or repeating a voice phrase in a microphone. Many types of point-of-service access devices, such as desktops and laptop computers, mobile phones, wireless pocket devices and airport kiosks, may be used at any time by end users. Each device may have limited capabilities to request and gather a specific biometric from the user. Therefore, the authentication server must dynamically determine what biometric to request, based on the client device.

To complete the process, a user's credentials must be evaluated against a stored pre-enrolled user information profile, such as biometrics templates, digital certificate keys and text passwords. Repositories of this information may be centralized in protected databases or decentralized within personal tokens or smart cards. With the use of a smart card that contains the enrollment data, the authentication server would also prompt users to present their template cards instead of accessing them from a central database.

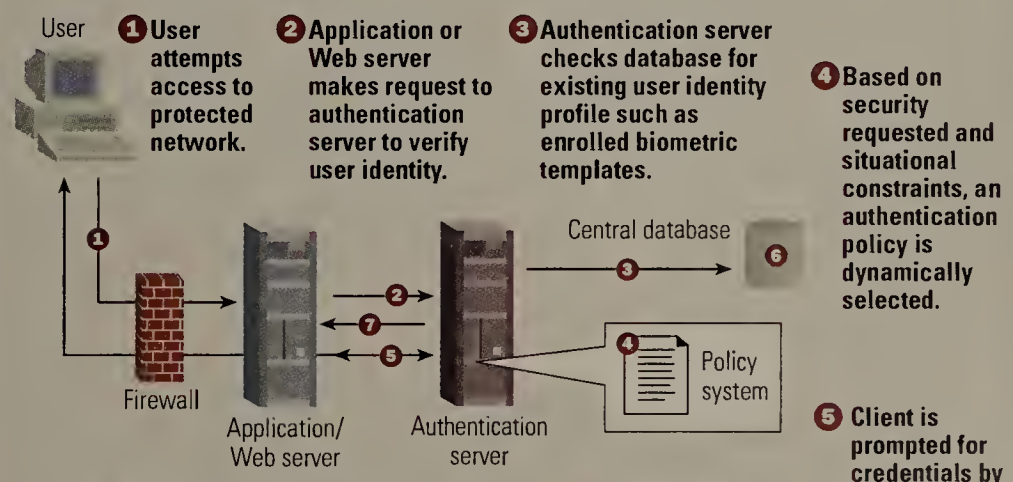
While there are advantages to using biometrics, authentication should not forego other methods as part of the overall authentication solution. Even old-fashioned PIN codes and passwords provide an extra layer of protection and may be preferable in lower-risk security systems. Other security technologies, such as public-key infrastructure, also perform critical roles in an overall security model.

Benado is director of product management at Keyware. He can be reached at jbenado@keyware.com.

HOW IT WORKS

Biometric middleware handles authentication on the fly

Biometric middleware determines what level of authentication is required for a particular user, then requests the credentials, matches them against the database and validates the user.



Got great ideas?

Network World **is looking for great ideas for future Tech Updates. If you've got one, and want to contribute it to a future issue, contact Features Editor Neal Weinberg (nweinberg@nww.com).**

Gearhead . inside the network machine . Mark Gibbs

BY ANY OTHER NAME ...

So last week we started looking at the Domain Name System. We got as far as discussing the issue of DNS servers having to refer queries they can't answer to other servers.

The nagging question remaining like a week-old used sports sock under your bed that you occasionally smell but not enough to actually be able to go and find it was this: How do DNS server referrals actually work?

Gearhead is here to help you find your cast-off sock and answer the DNS question. But we need to cover a lot of ground first....

The first concept we need to cover is the distinction between DNS subdomains and DNS zones. For example, we call gibbs.com a DNS second-level domain (although, of course, it is a subdomain — only the root of the DNS tree is a domain. We know, picky, picky, picky). And in this subdomain there might be lower subdomains such as accounts, engineering and custserv.

Now a department (for example, engineering or custserv) might have the skills to run a DNS server of its own so it could administer its own subdomain. The subdomain would be "delegated" and the server would be said to be "authoritative" for that subdomain. These subdomains can be any size (DNS records) or depth (levels of the DNS tree).

In this case, the gibbs.com zone would include all subdomains except those that have been delegated away, while the gibbs.com domain would include all the subdomains.

The importance of this distinction is that DNS servers load data only for zones they are authoritative for rather than for an entire subdomain (although if they delegate nothing, the zone they manage is equivalent to the entire subdomain).

Now there are two types of DNS servers: primary masters and secondary masters (the latter are sometimes called slaves). Primary masters load their zone data from locally stored files.

Secondary masters can load their zone data from a local file and then check them by referencing a master server (that is, either a primary master or another secondary master), or they can simply load the zone data from the master server. This replication of zone data is called a zone transfer.

Secondary masters are used to provide redundant service as well as to spread the load — for example, having two secondary masters on a subnet and having computers use one as their primary DNS server and the other as their secondary DNS server minimizes the load on the primary server.

To minimize the load on the primary master further, you could arrange for one secondary master (which we'll call PM1) to get its zone transfers from the primary master, while the other secondary master could retrieve its zone data from PM1.

Just to give you way more options than you'd ever think necessary, a DNS server can be authoritative for multiple zones and be a primary master for one zone while it is acting as a secondary master for another zone.

Well, darn. We didn't cover enough ground after all so, next week, we'll see if we can get on to referrals — but as DNS systems are pretty complex, we're promising nothing....

Deferred promises to gearhead @gibbs.com.

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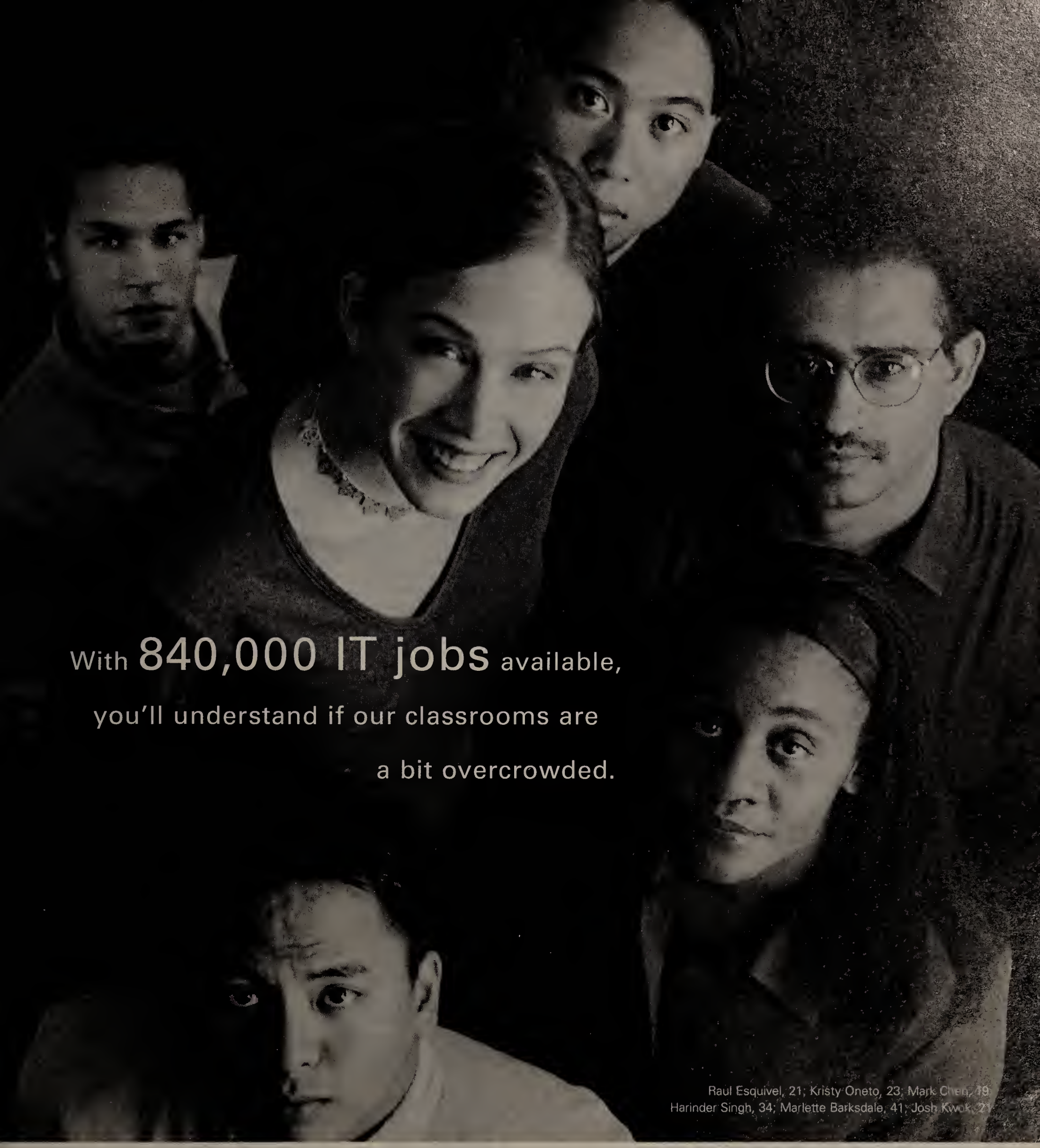

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Editorial

Basketball great's advice relates to IT management

Forget about the Oscars, the Emmys or the Webbys. The only award that really matters is the Best of the Tests Award, which *Network World* gave out last month at a gala, black tie event at ComNet 2001 in Washington, D.C. Of the 239 products we tested last year, only 16 made the grade.

Our guest speaker was Bill Walton. For those of you who don't follow basketball, Walton won two NCAA championships at UCLA, and two NBA titles. He's in the NBA Hall of Fame and was named one of the top 50 basketball players of all time.

So he does know a little something about being the best at what he does.

Those of you who do follow basketball probably know that Walton suffered a series of devastating foot injuries that kept him from even greater accomplishments. So he knows a lot about what it takes to persevere and overcome adversity.

And for those of you who see Walton today on television broadcasting NBA games, you might not know that he once had a severe speech impediment. So he knows something about improbable career changes.

Walton had some interesting observations on basketball, which also apply to IT management.

He said former Boston Celtics Coach Rick Pitino failed because he essentially micromanaged his players. Basketball is a game of creativity, and a successful coach (or a successful IT manager) lets people create.

Michael Jordan may be the best player ever, but Walton points out that Jordan played six seasons before winning an NBA title. Walton says Jordan first had to realize that his success depended on his teammates. And that's what successful managers do — make the people around them better.

Walton added that Jordan's legacy is not the flashy dunk. It's that you can be the best if you're more dedicated, more fit, more prepared, more mentally tough and more of a team player than the next guy.

Finally, Walton passed along this bit of advice. At his lowest ebb, sitting in a hospital, he got a postcard from the Grateful Dead (Walton says he's been to 600 Dead concerts) on which drummer Mickey Hart wrote, "Never look back."

We're not. We're out looking for the best network products we can find and gearing up for next year's Best of the Tests awards.

— Neal Weinberg
Features editor
nweinberg@nww.com

Message Queue

Too many servers

The article "Spending on the rise" (www.nwfusion.com, DocFinder: 3022) raises several good points. I am glad to see some of my peers finally getting the message that more servers is not necessarily a good thing. For some time now I have been promoting consolidation of small server farms into a few larger servers in dedicated data centers to cut down on operational and maintenance costs. The ranks of IT are growing in companies simply because of all the servers that need to be tended.

I am surprised at the allocations of spending for 2001, in that most of it seems to be in infrastructure, routers, hubs, network operating systems, network management tools and servers. But I understand why and agree that most companies have failed miserably to maintain the necessary level of their network's capabilities (speed, power and so forth). The one thing I would be focusing on, besides improving my network's capacity to handle large volumes of data speedily, would be the area of collaboration and groupware. As we move through the digital age, the ability to leverage knowledge and intellectual capital will become the competitive advantage. Wireless will be of paramount importance. Companies that don't step up to the table and fund IT like the strategic asset that it is will be left in the wake of those that do.

John Woodhouse
Director of IT
Textron Fastening Systems
Troy, Mich.

Mouse control

The article "Poor mouse control hurts digital KVM switch" (www.nwfusion.com, DocFinder: 3024) misses the point when it suggests using PCAnywhere. Doing so puts overhead on each server. In addition, PCAnywhere won't run on non-Wintel boxes. In contrast, Avocent's digital keyboard, video and mouse switch, the DS1800, allows for unlimited-sized KVMs with full access from the outside, such as with collocated servers at large ISPs. I suggest that you research large matrix switches such as the Apex Viewpoint, Cybex XP4000 series, Raritan Paragon and CCC Freevision to see the need for large switches, then see how limited their remote access/control solutions are compared with the DS1800.

Gary Davis
President
The Work Center Corp.
Los Angeles

See you in court

Regarding "Courts to hear DSL users' complaints" (www.nwfusion.com, DocFinder: 3023):

In Qwest territory, the users would have nothing to sue over. The tariff that describes Qwest's DSL offerings holds that there are no committed access rates and that the bandwidth figures in the tariff are not guaranteed. There is also no discussion regarding uptime.

It seems that DSL is tariffed specifically to allow poor service and low bandwidth.

David Hiers
Network engineer
Gobosh
Portland, Ore.

Timely update

As soon as I was done reading "Lotus putting 4.6 out to pasture" (www.nwfusion.com, DocFinder: 3025), I e-mailed it to my supervisor. As a Notes administrator/developer, I too have fallen into the "well, if it ain't broke, don't fix it" frame of mind. Thanks for the update.

Steve Kuplic
Arlington Heights, Ill.

Alternate routes

Regarding the article "DNS software hole allows Web attacks" (www.nwfusion.com, DocFinder: 3026): It might be worth pointing out that there are alternatives to the Internet Software Consortium's Berkeley Internet Name Domain. Most notably is djbdns (http://cr.yp.to/djbdns.html), which was engineered from the ground up to not ever have security flaws. There is even a monetary reward for anyone who is able to expose any such flaws.

Vern Hart
Boise, Idaho

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, *118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.*

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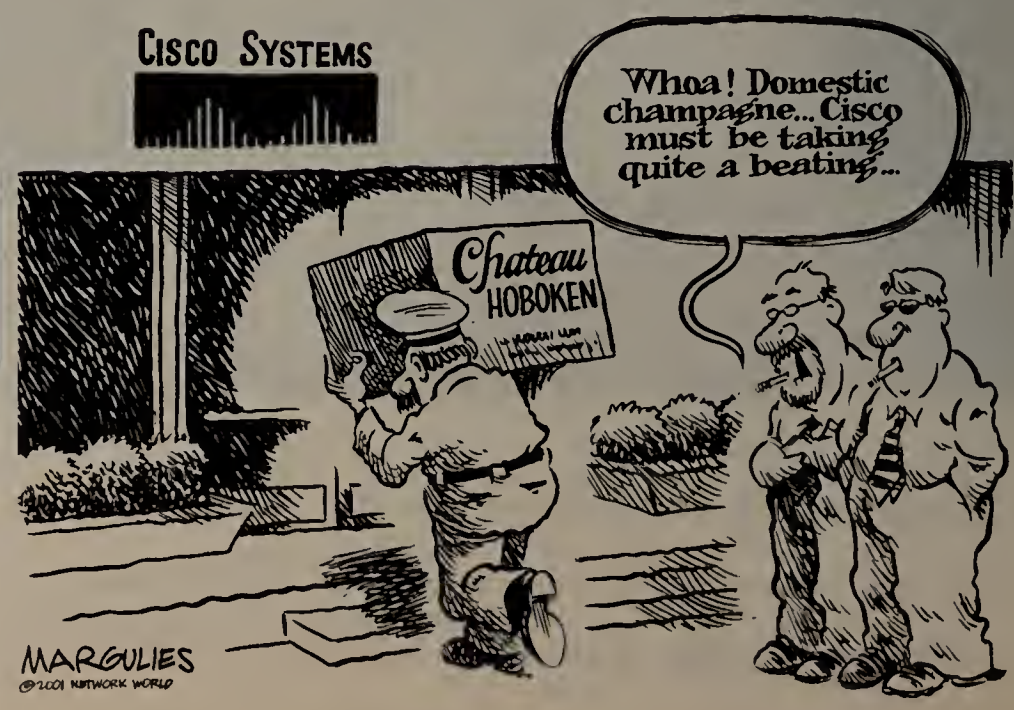


Bottom Line . Joel Snyder

PREPARE NOW TO AVOID FALLING VICTIM TO HARD TIMES

If you haven't noticed that dot-coms are becoming drop-coms (as in "dropping like flies"), then you need to wake up. More importantly, you need to realize that this situation is going to have an impact on your business.

The good news is you'll be able to fill those 2-year-old technical staff positions you haven't been able to find people for. The layoffs going on right now aren't just the dead wood — there are seriously good people being given their walking papers.

The bad news is one or more of your suppliers is going to fold this year, and you need to be prepared for that, too. Even companies that survive are going to be doing some serious belt-tightening. That's going to translate into stress in areas such as customer service and support as well as capacity and infrastructure.

You should be making a list of all your suppliers — software, hardware and especially services. Go down that list and ask yourself, "What would the impact on us be if this company closed its doors?" Don't always look at the worst case, either. Think about degraded service, delayed releases or technical support personnel who can't call you back in a timely fashion. If your suppliers are squeezed, but not broken, how is that going to affect your operations?

Look up the line as well. If you've got an application service provider-hosted application in a data center, what happens if the power goes off in the computer room? Or the ISPs serving the data center stop passing bits?

Also, start working with potential alternative and back-up vendors. If the DSL vendor for your telecommuters goes under, who else can service those homes? If your T-1 line starts to behave more like a 56K bit/sec line, who else can bring you bandwidth?

IT managers have moved heavily toward single-vendor solutions recently to increase discounts and build relationships. That's an excellent strategy, unless your single vendor files Chapter 11. This year is a good time to diversify. Good suppliers will understand if they don't get every last dollar of your business.

Third, review your disaster recovery plans and security policies. Your own company is probably not immune from a little belt-tightening, and your risk is always highest at times like this. Are your access controls — physical and virtual — strong enough to withstand an emotional and educated insider with ill intent? No one wants to think that co-workers would turn from assets to attackers in a few seconds, but you ignore human nature at your company's peril.

An economic slowdown only means crisis if you fail to plan. Look around now and ask, "How will this affect my company?" By preparing for what's ahead, you can help ensure the health of your entire organization.

Snyder, a Network World Global Test Alliance partner, is a senior partner at Opus One in Tucson, Ariz. He can be reached at Joel.Snyder@Opus1.COM.

Speaking the LANguage . Linda Musthaler

NOVELL KEEPS ON MAKING THOSE CH-CH-CHANGES

How ironic that Novell should use David Bowie's famous song about "ch-ch-changes" in its latest ad campaign. During the past two decades, few IT companies have demonstrated prowess at changing in order to survive quite the way Novell has. This constant need to change has been precipitated largely by Novell's lack of vision of what it wants to be when it grows up.

Novell began life in 1979 as a computer manufacturer and maker of disk operating systems. By the mid- to late-1980s, the company was the leader in the up-and-coming LAN market. Novell's NetWare was setting the PC world on fire, as companies discovered they could take those islands of corporate PCs and link them to share files and printers.

By the early- to mid-1990s, NetWare was the network operating system for banks of PCs connected for communications and resource sharing. Novell, it seemed, was on top of the world.

I remember the day back in 1990 when it was announced that Novell was merging with Lotus, at that time a formidable player in the office suite market. What a powerhouse combination that could have been! But alas, the marriage of Lotus and Novell never took place. Each found other suitors: Lotus pairing with IBM, and Novell with WordPerfect. But Novell and WordPerfect didn't make beautiful music together, and they went their separate ways not long after the merger.

In search of a vision, Novell redefined itself again and again with a succession of leaders, including four CEOs in a span of about seven years. Product visions came and went. Anyone remember SuperNOS, which was supposed to tie together applications such as WordPerfect and GroupWise, as well as servers running NetWare or Windows NT? Unlike Superman, SuperNOS didn't fly. And don't forget UnixWare, the marriage of NetWare with Unix. The resulting offspring wasn't pretty, and The Santa Cruz Operation took sole custody of that baby in 1998.

Undaunted, Novell tried to get serious about object-oriented programming with Serius, but that venture also died.

Despite these failed visions, Novell is credited with developing some superior technology. Products such as NetWare, NetWare Directory Services, BorderManager and ZENworks deserve all the praise they garner from customers and analysts. Tired of competing with Microsoft and other industry giants, Novell has developed the latter tools to complement what other operating systems and application companies are doing. Smart move.

Last year was a tough one for most tech companies, but especially for Novell. Revenue and the company's market value plummeted at the beginning of 2000 and have yet to recover. CEO Eric Schmidt blamed the sharp downturn on "dramatic declines in traditional packaged software sales" as well as slow growth in new Internet services that Novell now provides.

Down but not out, Novell once again has set lofty goals, this time for a "one Net world" — a world in which "individuals must be able to access their own information, the way they want it, any time, anywhere, from any device." Whew. Talk about a tall order.

To achieve this one Net world, Novell will focus on providing services that allow traditional and new Internet-based IT resources to be mixed and matched. The prime directives center around security, identity, acceleration and management (note the distinct absence of Novell's former core business, network operating systems). Although NetWare still exists as a product and a business unit within Novell, it's hardly the star of the show anymore.

Every so often rumors run rampant about Novell being bought by some other company — IBM, Computer Associates, Microsoft. Some analysts have suggested the company should split itself apart. While these ideas aren't entirely ludicrous, they aren't necessary either. Novell has plenty of cash in the bank and virtually no debt. It can live on as an independent company as long as it finds its vision and its groove. I, for one, hope this once mighty company finds both soon and withstands the ch-ch-changes of time yet again.

Musthaler is vice president of Currid & Company, a Houston technology consulting firm. She can be reached at linda@currid.com.

Does your netw

Results of Network World's architecture survey.

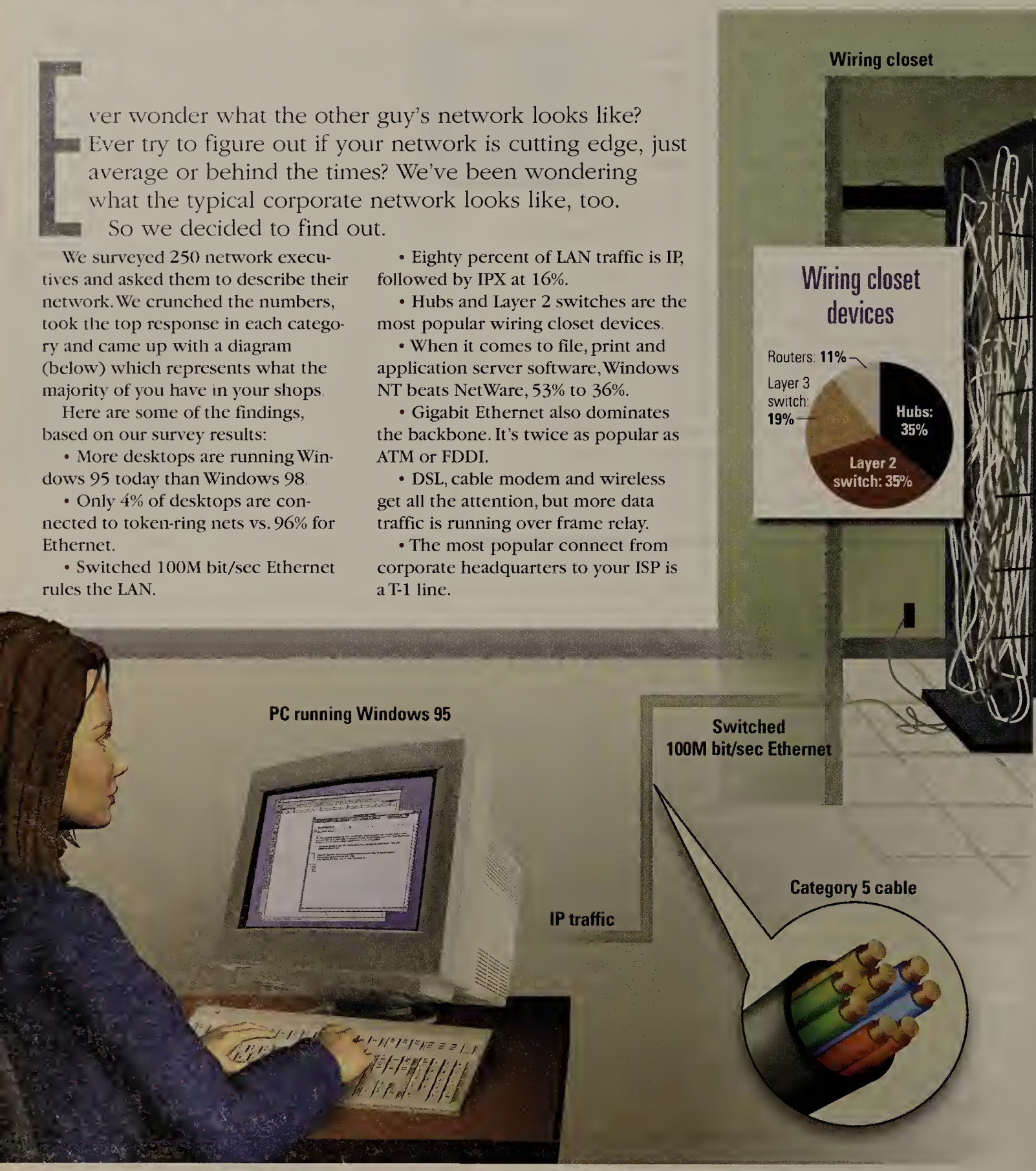
Ever wonder what the other guy's network looks like? Ever try to figure out if your network is cutting edge, just average or behind the times? We've been wondering what the typical corporate network looks like, too.

So we decided to find out.

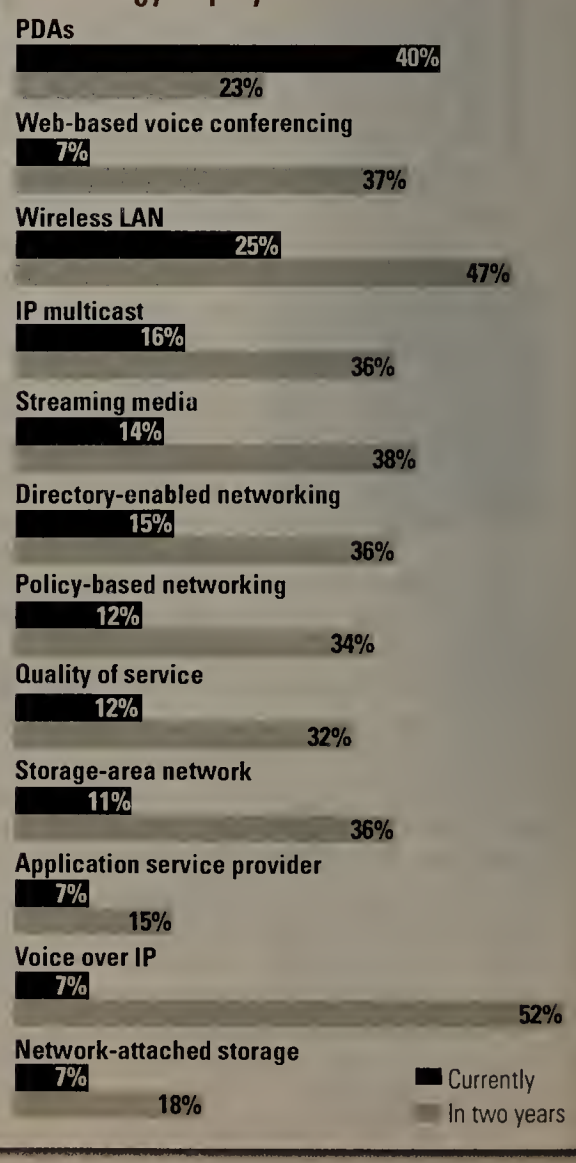
We surveyed 250 network executives and asked them to describe their network. We crunched the numbers, took the top response in each category and came up with a diagram (below) which represents what the majority of you have in your shops.

Here are some of the findings, based on our survey results:

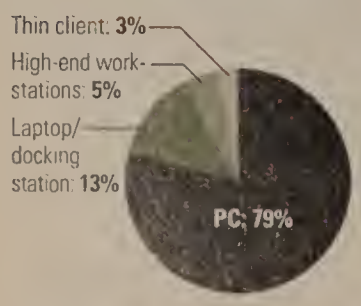
- More desktops are running Windows 95 today than Windows 98.
- Only 4% of desktops are connected to token-ring nets vs. 96% for Ethernet.
- Switched 100M bit/sec Ethernet rules the LAN.
- Eighty percent of LAN traffic is IP, followed by IPX at 16%.
- Hubs and Layer 2 switches are the most popular wiring closet devices.
- When it comes to file, print and application server software, Windows NT beats NetWare, 53% to 36%.
- Gigabit Ethernet also dominates the backbone. It's twice as popular as ATM or FDDI.
- DSL, cable modem and wireless get all the attention, but more data traffic is running over frame relay.
- The most popular connect from corporate headquarters to your ISP is a T-1 line.



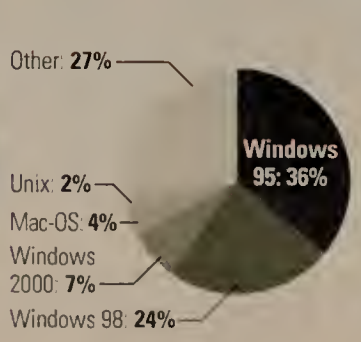
Technology deployment



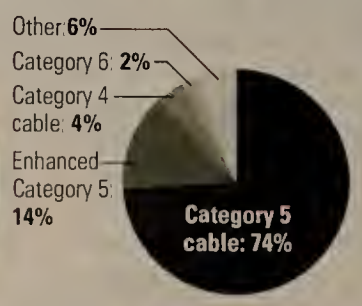
Desktop devices



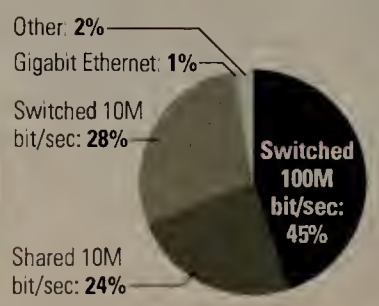
Desktop operating system



LAN cabling

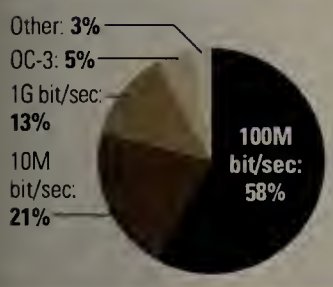


LAN speed

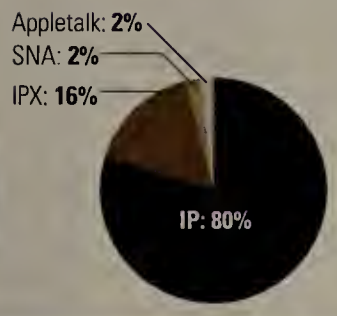


ork stack up?

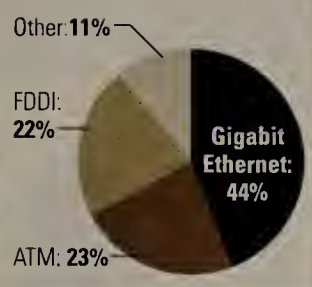
Wiring closet to backbone connection



LAN traffic profile



Backbone



Data center servers

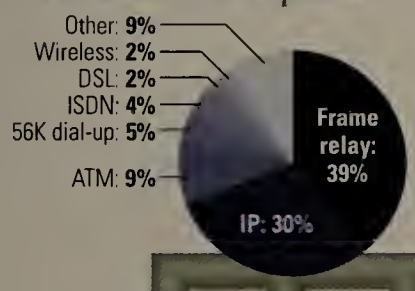
Gigabit Ethernet switches

100M bit/sec Ethernet

100M bit/sec Ethernet

ILLUSTRATION BY GRANT JERDING

WAN data traffic pattern



WAN access router

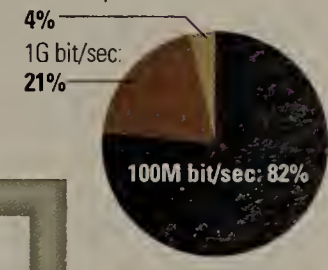
Frame relay

T-1

T-1 T-1 T-1

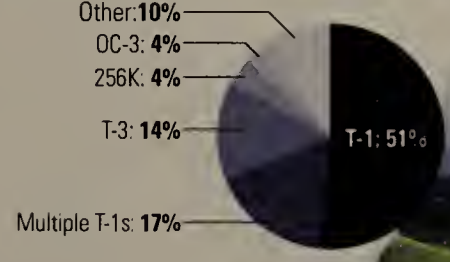
Branch offices

Backbone switch to back-end servers connection



Multiple responses allowed

ISP connection speed from corporate headquarters



ISP

PUBLISH OR PERISH

CONTENT MANAGEMENT TOOLS AUTOMATE WEB PAGE PRODUCTION

BY SUZANNE GASPAR

A YEAR AFTER LAUNCHING a business-to-business e-commerce site for the component manufacturing division of Sharp Microelectronics, product marketing managers were flooding the IT staff with requests to add information to the site.

Selling components online is a programming-intensive, error-prone process, says Don LaVallee, director of strategic business operations for Sharp in Camas, Wash. "Accurate information is extremely critical with our products because engineers won't buy the product if they don't find the detailed specifications they need."

With plans to increase the number of active pages from 400 to 2,000, and no new staff in sight, LaVallee started looking for content management software. He wanted tools to manage Web pages, to provide links into Sharp's databases, and to replace paper requests for changes to a Web page with an automated workflow system.

Today, Sharp's Web specialists spend time designing complex applications, while the product managers use the Eprise Participant Server software to add content and put pages in production. When a product manager makes a change, a version of the page goes through an automated workflow that notifies management, sales and support staff, and even customers. Eprise didn't offer everything LaVallee wanted, but it was simple and easy to install, and didn't require extensive in-house programming.

Vendors have been quick to respond to IT's growing need to get a handle on Web content. Pure-play Web content management vendors such as Interwoven and Vignette have been joined by e-commerce vendors BroadVision and Open Market, plus document management vendors Documentum and FileNet.

Products range from quick and dirty tools with limited functionality to full-blown frameworks with proprietary code and long lead times. There's no one product that does everything out of the box.

"It gets down to business drivers and what is actually in the enterprise and what you need," says CAP Ventures analyst Leonor Ciarlone. A company may want to buy everything from one vendor, or they may have already bought personalization software and an application server and just need to bolt in the content management piece, she says.

Paul Maidment, deputy managing editor for Financial Times, ft.com, a global financial news Web site, is using Open Market's

BEFORE YOU COMMIT...

Assess the software's support for workflow, archiving and native authoring tools.

Consider requirements for personalization and dynamic content generation.

Evaluate aggregation and multiformat publishing functions.

Review development skills needed.

Set site standards for a common look and feel.

Expect a long lead time for software setup.

Plan for arduous migration of existing content.

Roll out the software one site-section at a time.

Content Centre and Content Server as a central hub for managing and publishing content online.

OpenMarket's software was selected for its ad management, community and publication tools. However, it doesn't have industrial-strength editing tools, Maidment says. "One thing was very striking when we were looking around at what was available: There was no product that had everything that we wanted for ft.com," Maidment says.

Maidment says that OpenMarket's software scales well through the use of a relational database to store content. But Maidment says he's had to do more custom coding than he anticipated.

Maidment adds that he considered Vignette, but ruled against it because the company's product is based on a proprietary code called Tickle. "We just couldn't get the Tickle programmers so we thought it would be a problem going forward, and practically all of them work for Vignette. Making a change to your site is an expensive, big deal when trying to find someone with the code experience, especially with a site that changes fairly often. It would have been a huge obstacle," Maidment says.

Scalability was a top priority for travel site application service provider FireVine, says Clay Elting, executive vice president and CTO. FireVine selected Vignette's software to manage content on thousands of client sites. Aside from high volume, the content-management system needed to tie in with customer relationship management software, Elting says.

Similarly, First Union bank was looking for software that could handle more than 20 individual types of workflows that result in the management of more than 8,000 documents. That level of complexity drove First Union to select Documentum, says Tom Kitrick, vice president and manager of the Knowledge Management group at the bank.

The bank is happy with its choice, but Kitrick points out that implementation isn't easy. "For the integration of the publishing presentation tools, there's tremendous systems integration work that went into it. We don't want to give you the impression that this is, 'Crack open the box, load it on a server and Documentum's ready to go in a week.' Documentum is a platform, a development environment," Kitrick says.

Jim McIntosh, marketing Web manager for Evans and Sutherland, a computer graphics company, had a similar experience with NCompass Resolution. "Had we started from scratch, plopped in a template, and worked with NCompass Resolution to build a new Web site, we could have it done in a week, swear to God," McIntosh says.

Pulling all the content over from an existing Web site and trying to build applications with it is tedious, McIntosh says. He says an end user has to figure out how to store pre-existing content. "Understanding how to structure that is kind of confusing, and it adds a lot of work as far as setting up the workflow," he says. Additionally, Resolution doesn't directly integrate with legacy systems. However, it allows you to reuse code to run the application the same way, McIntosh says.

Edison Electric, a trade association site representing publicly traded, investor-owned utilities in the U.S., is also using Eprise Participant Server to relieve a content bottleneck, says CIO Jon Arnold.

Arnold was leery about going with a proprietary framework and being dependent on specialized programmers, so he went with Eprise. IT participated in the Eprise Jump Start program, got acclimated to the software and moved a pilot area of the site into operation.

The process forced the Web team to think differently about workflow, to understand how the content management software impacts the end user. Deploying the content management software also required a change in handling user access, a move from proprietary security measures to an LDAP directory system for secure access to Eprise.

Users advise not to rush the implementation. Take time and build up your in-house expertise. The more you play with it, the better you get at squeezing functionality out of a content management system. ◪

THE KEY PLAYERS

EPRISE **/ Participant Server**
(508) 661-5200, www.eprise.com. Provides workflow for content creation, maintenance and publication; offers versioning and rollback; separates content from presentation for user profiling and personalization.

OPEN MARKET **/ Content Centre, Content Server**
(781) 359-3000, www.openmarket.com. Provides workflow; supports creation, editing, management, scheduled publication and multichanneled content delivery; optional tools for personalization and commerce.

INTERWOVEN **/ TeamSite**
(408) 774-2000, www.interwoven.com. Provides source code management and workflow for collaborative content creation; separates content from presentation; supports content from file systems and databases.

BROADVISION **/ One-To-One Publishing**
(650) 261-5100, www.broadvision.com. Creates, publishes, updates and versions content; repurposes content for publishing to multiple channels; optional tools for personalization and commerce management.

DOCUMENTUM **/ 4i eBusiness Platform**
(888) 362-3367, www.documentum.com. Provides strong document management and content workflow; open platform integrates with front/back-office applications; repurposes content for multichanneled publishing.

VIGNETTE **/ V/5 eBusiness Platform**
(512) 306-4300, www.vignette.com. Provides workflow and collaborative content creation; separates content from presentation; supports profiling and multichanneled delivery; integrates with front/back-office applications.

NCOMPASS **/ Resolution**
(877) 606-0950, www.ncompasslabs.com. Provides workflow for content creation, publication and scheduled content expiration; repurposes content for personalization and multichanneled publishing.

INTRANET SOLUTIONS **/ Xpedio Content Server**
(925) 903-2000, www.intranetsol.com. Automates workflow for collaborative content creation; converts content to Web formats for publishing; provides version control, personalized user access and LDAP integration.

E-BUSINESS TECHNOLOGIES **/ engenda**
(401) 752-4400, www.ebt.com. Automated workflow and versioning; forms-based authoring and native MS Word support; separates content from presentation for dynamic publishing; integrates with application servers.

FILENET **/ Panagon Web Services, Content Services**
(714) 327-3400, www.filenet.com. Provides strong document management; creates, manages, secures, dynamically updates content; collaboration and versioning; optional Web publisher tool.

WORLDWEB.NET **/ Expressroom I/O**
(703) 838-2000, www.worldweb.net. Content creation, management and workflow; imports MS Word and QuarkXpress content; templates, versioning and rollback; repurposes content for multichanneled dynamic publishing.

TRIDION **/ DialogServer, Localisation Manager**
+31 0 20 20 10 500, www.tridion.com. Content creation, management and workflow; browser-based authoring and collaboration; repurposes content for multichanneled dynamic publishing; automated language translation.

SIX OPEN SYSTEMS **/ SixCMS**
+49.711.99091-0, www.six-us.com. Workflow, templates and authorization management; multilanguage browser interface; separates content from presentation; scheduled and dynamic multichanneled publishing.

PERCUSSION SOFTWARE **/ Rhythmyx Content Manager**
(800) 283-0800, www.percussion.com. Browser-based content creation; approval workflow; manages multicontent types; separates content from presentation for personalized, dynamic, multichannel publishing.

CYTURA **/ Content Manager, Profiler, Site Builder**
(407) 246-7300, www.cytura.com. Workflow to publish content; browser-based authoring; aggregates multicontent types; user profiling and tracking; layout and page building.

Tester's choice . Barry Nance

TESTING, TESTING...1, 2, 3

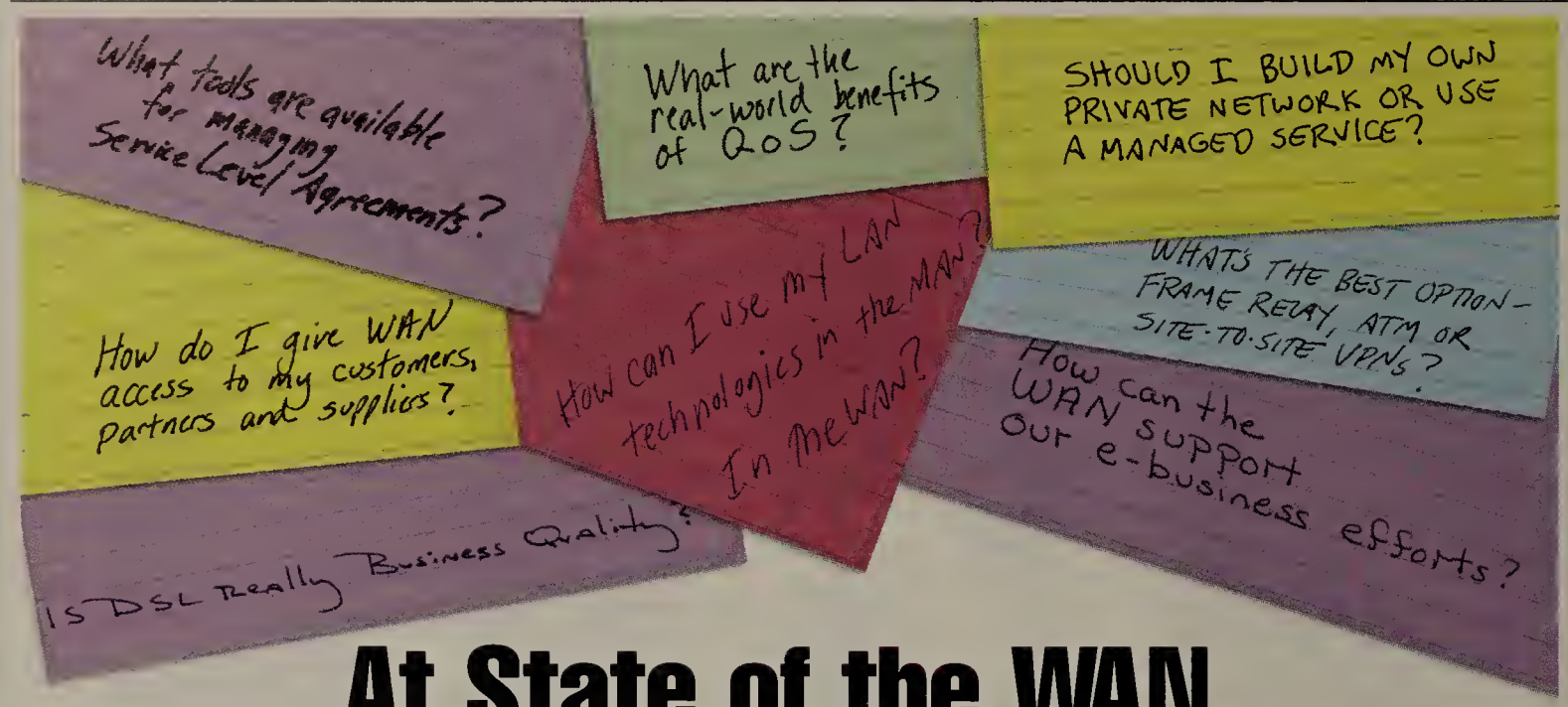
When you're evaluating a complex networking product, dealing with a vendor's sales and marketing people is often unavoidable. You need product details and answers to technical questions. In return, these folks need feedback from you. Especially when a product doesn't really work as advertised, vendors need to hear straight talk about the problems and issues you find.

Here are examples of situations in which you can give as good as you get:

- When a vendor responds to a technical testing query with, "What do you mean it's slow? It's plenty fast enough in our lab," this claim bears careful scrutiny. Nonetheless, once you determine you're operating the software correctly on the right hardware, be quick to point out a sluggish user interface or a network processing bottleneck. As a programmer, I've many times had to revise my computer programs to eliminate a performance problem. You can expect the same from the vendor's programmers. Tell the vendor you'll need to see some performance improvements before you'll buy the product.
- Another vendor might say, "That feature's in our product because we're sure customers will find it absolutely indispensable." You and I know the best software tools are the ones that do the most work yet demand the least attention. If you anticipate you'll not use a feature, let the marketing people know. More importantly, consider the possibility that some aspect of the unneeded feature may lie within the product's core. While the user interface may imply you can avoid the feature, the programmers probably borrowed some of the feature's behaviors to implement other features. Even if you're not going to use a feature, test it thoroughly anyway to understand its full effect on your network.
- "All our customers already have product X for accomplishing ABC, so our product doesn't do ABC." I know potential customers who don't have X but could otherwise make excellent use of the ABC-challenged product. Unless getting product X is a no-brainer, suggest strongly to the vendor that programming the ABC feature isn't difficult or time-consuming. If the ABC feature would be a work-reducing, natural addition to a software product, you might even wait until the vendor's programmers implement ABC before buying the product.
- "Yes, that feature will be in our next version, which we plan to release soon. You'll get a free upgrade." At a sales meeting, especially if the vendor's people have made friends with you and seem quite likable, resisting the "next version" ploy is psychologically difficult. However, resistance is not futile. If you decide to buy the current version, make sure you put in your sales contract a penalty clause protecting your interests if/when the new version is substantially late or doesn't include the feature you're looking for.

Holding a vendor's feet to the fire is beneficial to everyone. You get more for your money, and the vendor winds up with a better product.

Nance, a software developer and consultant for 29 years, is the author of Introduction to Networking, *4th Edition and* Client/Server LAN Programming. *You can reach him at barryn@telocity.com.*



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NetworkWorld REVIEW Network management

Watching over Linux

Caldera's new product brings Linux system management under one umbrella.

BY TOM HENDERSON,
NETWORK WORLD GLOBAL TEST ALLIANCE

NetResults

Volution 1.0

RATING: 2.35 **COMPANY:** Caldera Systems, (888) 465-4689, www.caldera.com **COST:** $2,999 per server and $149 per client **PROS:** Allows sophisticated policies; client/server uses secure tunnel; uses common Lightweight Directory Access Protocol Version 3 services; actions are completed quickly. **CONS:** Console needs work; documentation skimpy; requires Red Hat Package Manager support; expensive.

	Performance 40%	Management features 30%	Ease of use setup 20%	Documentation 10%	Total score
Volution 1.0	3	2	2	1.5	2.35

Scoring key: 5: Exceptional showing. Defines the standard of excellence; **4: Very good showing.** Although there may be room for improvement, this product was much better than average; **3: Average showing.** Product was neither especially good nor exceptionally bad; **2: Below average.** Lacked some features or lower performance than other products or than was expected; **1: Considerably subpar,** or lacking features being reviewed.

The growth of Linux in the corporate world has been hobbled by a lack of enterprise-quality network monitoring, management and software distribution tools. Enter Caldera System's Volution 1.0, which is designed to make a Linux systems administrator's life much easier. While point products that handle tasks such as remote health monitoring, hardware inventory and software distribution have been available for years, network administrators had to graft different tool kits together to get a full set of utilities. Volution offers these tools and the user interface that ties them together in one package.

Released last month, Volution is a Web-based network management system. Its strength lies in its ability to monitor many Linux systems — clients and servers — for system troubles such as full disks, overloaded applications and system failures. Another strong suit is its ability to push out scheduled software distributions, the kind that can rapidly update client and server systems in the event of a critical security patch, for example. Our only complaint — as is the case with the initial release of many products — is its rough edges in terms of its setup, interface and documentation that will likely be fixed with the first upgrade.

Volution, like other network management packages, revolves around software distribution, network printer management, system inventory and system/device monitoring. Linux software distribution has traditionally been simpler than distribution on Windows platforms because Linux software applications are generally well documented and their dependencies understood. Volution extends one of the main distribution methodologies, Red Hat Package Manager (RPM), to allow rapid and methodical desktop software management.

Although the package is still a bit raw in terms of its ease of use, we could rapidly build working policies for distributing base application packages and incremental updates based on system-specific features. We were initially worried that the console daemon became inaccessible to a browser, but that didn't seem to affect the scheduled operations. After a daemon restart, accessibility of the console to a browser access returned.

Volution performs queries of its constituent clients and servers for hardware and software information. It then tucks this information into a Lightweight Directory Access Protocol (LDAP) Version 3 database that has schema extensions to support the product. The LDAP foundation must be built from Novell's eDirectory (easily linked), OpenLDAP (included) or AOL/TimeWarner-Netscape iPlanet prior to installation.

The Volution software components examine and take action on the objects stored in the LDAP database according to a defined action schedule set up by the administrator. We recommend installing an SNMP console prior to installing Volution because one isn't included with the Caldera product now, and you'll need one to collect SNMP trap information from the machines you are managing. But this isn't a major hurdle to using the product because many Linux distributions include an SNMP console in their commercial bundles.

In the Volution universe, Linux machines assume the role of server, client, directory source or RPM source. Unfortunately, Volution does not cover all Linux systems but supports Caldera's e-Desktop 2.4 and Server 2.3.1, Red Hat's 6.1/6.2, TurboLinux's 6.0, SuSE's 6.4 and LinuxMandrake's 7.1 (client only). Because of the RPM limitation, Debian and Windows clients aren't covered by Volution. Servers must use a specific Apache Web server daemon, ApacheJServer1.1.1, which is supplied in the Volution bundle.

We set up 11 clients and two servers (see "How we did it," page 52) using Volution's Version 1.0 distribution CD and a single directory source. Most of the work involved in using Volution occurs when you are building relationships between the devices on your network. Volution's browser console interface doesn't lend much clarity to how you accomplish this task. We took the supplied examples and rapidly populated information about the Volution client computers, then started building policies that would take inventories of their hardware and software.

The strength of Volution lies in its object-oriented construction. We quickly built a management/monitoring platform from objects that we created. The objects consisted of computers, groups of machines and several software repositories. We then generated policies such as system health monitoring and software distribution. We found Volution's printing policies to be very useful. Managing printing policies is often tedious in Linux, and Volution offers a method for managing network print job capturing, queuing, indirection and job control management.

Once we built the base platform, the product worked quietly in the background while remaining easily accessible and changeable. The product's software distribution tasks were useful for new installation of packages, but we found that updating existing client packages was occasionally problematic. Some software packages were updated incorrectly while others were not updated at all. We looked through the RPMs and the installation dependencies and couldn't find a reason for the occasional Volution action of ignoring an update on a client. Also, the primary console daemon, csmd, became deaf/mute on two occasions during simple browser access. Killing the daemon and restarting it corrected the problem, and we could find no damage or related consequence.

Because Volution uses a browser interface, console accessibility was excellent, but the interface lacks some drag-and-drop usefulness. Secure browser access can be easily enabled, although the default access is open. Scripts that ran Java servlets inside the browser console ran slowly despite our comparatively fast platform. Despite the slow server visual update, tasks such as hardware/software inventorying took place quickly. Unfortunately, the browser interface becomes a hindrance when viewing even the most simple of Linux software inventories because of the large size of inventories and the tiny amount of browser real estate that can be used, and the console lacks such common abilities. Scrolling the Volution browsed console became habitual; we were wearing a hole in the mouse pad.

Primary documentation is an outlined administrator's guide, which is terse and lacking useful examples. You have to know Linux and TCP/IP well to make the policies useful from a management perspective.

To our knowledge, there is no direct competitor to Volution that combines policy administration, monitoring, inventory management and software distribution. Organizations that have built a directory service around Novell's eDirectory will be

especially delighted with the ability to extend eDirectory functionality to Linux clients. Whatever directory service is used, Volution replaces the usual pages of scripts that are often used by Linux administrators to manage Linux servers and clients.

Volution isn't licensed under an open source methodology used by most Linux/Linux-like applications, and is quite an investment for many organizations used to the low cost of Linux components. The success of this package will be driven by the real economics of reduced cost of Linux networked system administration.

Henderson is principal researcher for ExtremeLab of Indianapolis. He can be reached at thenderson@compuserve.com.

How we did it

We set up a test network using 11 PCs (various Pentium notebooks and desktops) that ran Red Hat 6.2, Caldera eDesktop 2.4 or LinuxMandrake 7.1 Gold. Two servers, a Compaq ProLiant 3000 with twin 500-MHz CPUs and a Compaq DL380 machine with dual 733-MHz CPUs, were installed as Volution servers. These servers were running the directory services daemons and had Caldera eServer 2.3.1 or TurboLinux 6.0 installed.

We ran two tests, one using OpenLDAP, the other using Novell's eDirectory. We used ldif, a Lightweight Directory Access Protocol directory manipulation tool, to initially seed the directory databases with entries.

We also set up several SNMP Version 2.0 devices (hubs, a switch and a firewall) to send traps to Volution, which, in turn, serve as a gateway for traps and information sent to an SNMP console. We also used a Health Monitor policy to watch systems for various characteristics such as high CPU utilization and full file systems. We used Volution as a software repository for Red Hat Package Managers (RPM), as well as the manager for hardware and software inventory tasks. We used Volution as a software repository for RPMs and as manager for software and hardware inventory. We installed client software quickly from a _ftp:pub_ directory or CD. When a client is pre-installed with Volution, it becomes autoconfigured into Volution when it first appeared on our Volution network.

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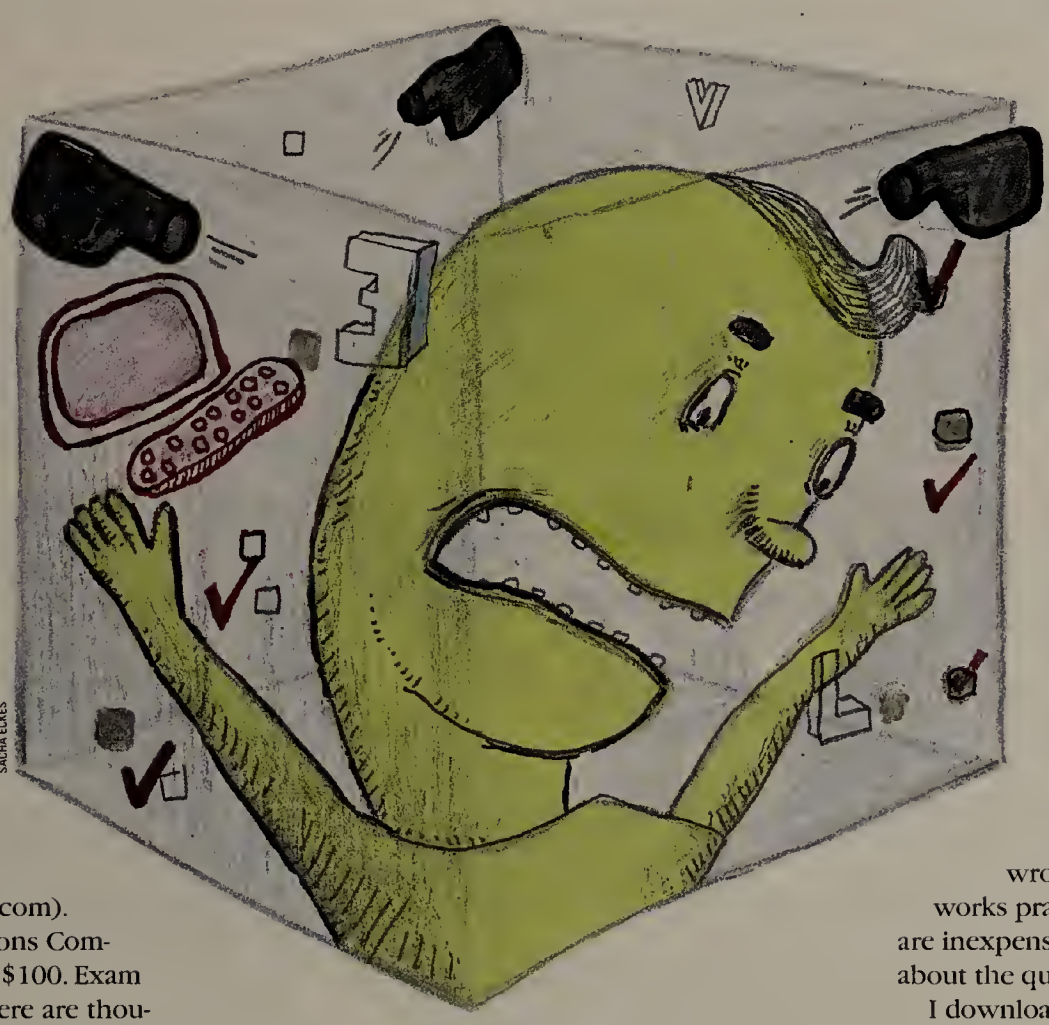
The road to CCIE

BY JEFF SHAPIRO

Certification candidate finds he needs some extra preparation to pass the routing exam.



SACHA ECKES

I hate tests. I hated them in grade school, I hated them in college, and I still hate 'em. Unfortunately, the only way to become a Cisco Certified Internetwork Expert (CCIE) is through tests — lots of them.

Although I completed all the classes necessary for the Cisco Certified Network Professional (CCNP) designation, I put off taking the exams for about a month, mostly out of fear. My fast approaching deadline for this article finally pushed me toward taking the four CCNP exams.

The Routing 2.0 exam is reputed to be the toughest, so I started there. I spent several days reviewing the lab materials I got from the Global Knowledge Networks course. Next, I read Cisco Press' *Building Scalable Cisco Networks* official preparation book cover to cover. I also attempted many of the exercises in the book.

I thought I would be ready for the exam in a week, so I scheduled the exam at a local testing center. There are two outfits that perform Cisco testing: Prometric (1-800-204-EXAM or www.2test.com) and Virtual University Enterprises (1-800-929-NETS or www.vue.com).

A week later I arrived at the New Horizons Computer Learning Center and plunked down $100. Exam fees are the same wherever you go, and there are thousands of authorized test centers all over the world.

I picked the New Horizons branch because it was conveniently located, but I chose well. The center was modern and airy. Once I helped myself to the coffee and snacks, the receptionist brought me to the testing room, where modern and airy ended.

The room was small and windowless. There were three computers separated by partitions, and there were video cameras mounted on the wall behind each computer. The receptionist acts as proctor and watches the monitor at her desk.

As for the exam, I can only speak in general. Everyone who takes a Cisco exam has to sign a form agreeing not to disclose anything about the form or content of the test. Cisco exams are standardized (except for the CCIE).

You have 75 minutes to complete the test, which contains a mix of multiple choice and short answer questions. Once you've answered a question and moved on, you can't go back.

Before you begin, the computer will show the grading range and passing score. You won't know if you passed until the exam is over and the screen displays either "You're Done" or "Congratulations! You're Done." Your test report will be waiting at the reception desk.

I was in trouble soon after I started the exam. I knew most of the material but it was getting all mixed up in my head. I knew I had failed before I was done. According to the printed results, I scored 100 points less than the passing grade. As I left the center I started to think about how I could have better prepared myself.

First, this exam was so hard it made the Cisco Certified Network Associate (CCNA) exam look like a walk in the park. I should have taken another week to study. Second, I had no idea what would be emphasized on the exam.

I should have read the official course syllabus posted on Cisco's Web site. Third, I got confused. I should have found and used practice exams, as I did prior to taking the CCNA exam.

It was obvious that I needed to practice before taking the test again. A friend recommended that I speak with David Rajala of Boson Software. Rajala's company creates and sells practice tests for certification programs. A CCNP who has done everything but take the CCIE lab exam, Rajala wrote the Boson Building Scalable Cisco Networks practice exam himself. The practice exams are inexpensive ($30 each), and I can't say enough about the quality.

I downloaded the test library from www.boson.com and used the unlock codes Rajala gave me. After drilling with the practice tests for two days, I returned to retake the routing exam.

This time I felt ready. Exactly 67 minutes later. I was looking at "Congratulations!" on my screen. When I collected the test report, I had boosted my test score by more than 250 points, a much greater improvement than I expected.

Next up, I began studying for the Switching 2.0 exam using my new methodology. I reviewed the course materials for two days, hit the books for three days, and spent another two with the Boson practice exams. The next day I took the exam with confidence and passed it easily.

Take the class, review the materials, study the book, read the syllabus, take some practice exams and soon you'll have four new initials after your name.

Shapiro is director of technology for the Kingsport City School District in Kingsport, Tenn. He can be reached at jshapiro@kpt.k12.tn.us.

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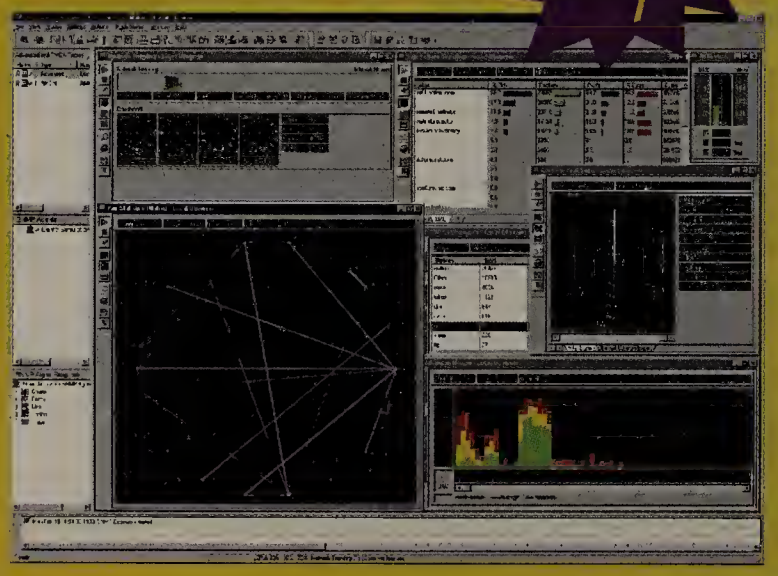

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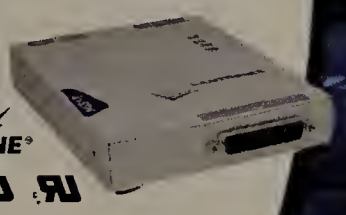

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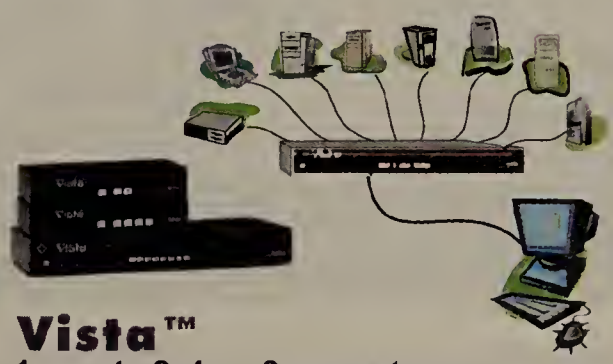

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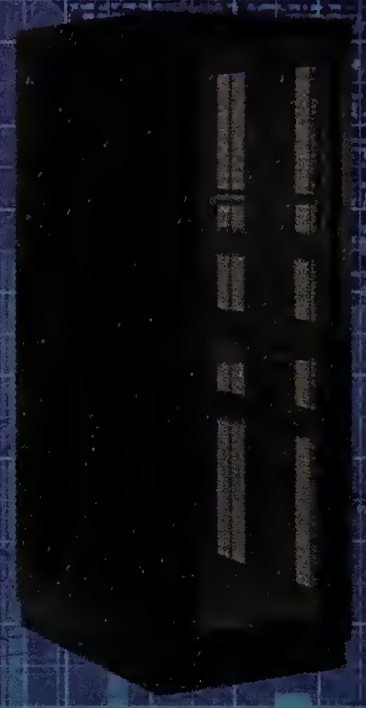

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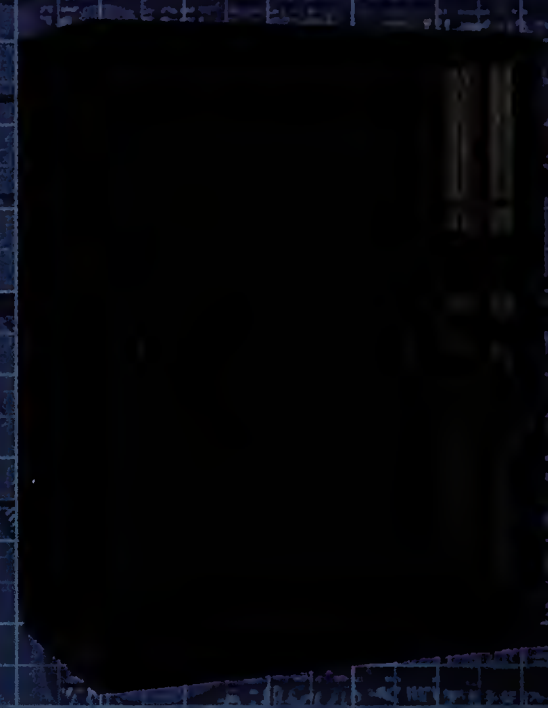

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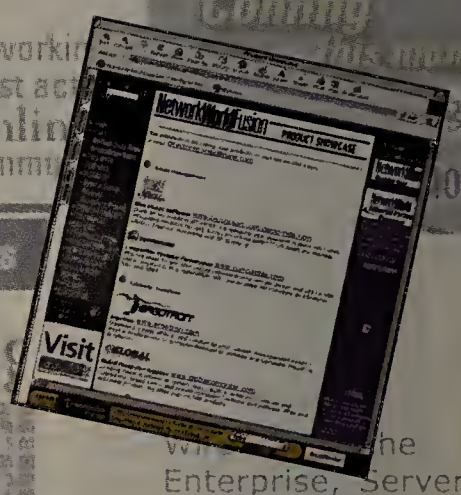

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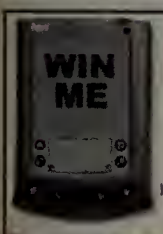

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SOFTWARE ENGINEER II

Responsible for the development of major portions of Host or Embedded software. Performs the functional design of familiar product components from specific product requirements with some assistance from more senior Software Engineers. Designs software modules with clearly defined functional requirements without assistance from more senior Software Engineers. Participants in group design activities and provides concrete input to the design of complete product components. Participants in and/or review test cases/test script development for the planned change to the Host or Embedded system. Makes changes to, or creation of, modules or product components that are completely designed. Troubleshoots problems and makes repairs in familiar modules or product components. Changes need only be periodically reviewed by more Senior Software Engineers prior to submission to development packs or development environments used by other Software Engineers. Responsible for general understanding of a GTECH site, its functions (both online and offline), and performs most of these functions with minimal assistance. REQUIREMENTS: B.S. Computer Science, Engineering, Programming or related field plus 2 years experience as Software Engineer II or 2 years experience as Software Engineer II or 2 years experience as Software Engineer or Computer Programmer. HOURS: 40+/wk. RATE OF PAY: $52,000/yr. SEND ALL RESUMES TO Ann Cody, Manager, Human Resources, GTECH Corporation, 55 Technology Way, West GREENWICH, RI 02817.

Software Engineer (Atlanta, GA): Responsible for research, design, development, implementation and testing of software products and business system applications, including new technologies and custom application solutions according to customer needs. Will work with other engineers on large-scale projects using Oracle databases, object oriented development techniques, Business Objects OLAP report tool, formal development methodology tools and Powerbuilder 5,6, or 7. Must have Bachelors degree or foreign degree equivalent in Computer Science, Engineering or related field, and two yrs experience as a Software Engineer. Two yrs mentioned experience may have been obtained concurrently and must include (i) 2 yrs experience programming in Powerbuilder 5,6 or 7; (ii)2 yrs experience using an Oracle database; (iii) 2 yrs experience using object oriented development techniques; (iv) 2 yrs experience using a formal development methodology tool; (iv) 2 yrs experience developing Oracle stored procedures with PL/SOL; (vi) 1 yr experience in Business Objects OLAP reporting tool; and (vii) 1 yr experience work on large-scale projects. Must have legal authority to work in the U.S. Send resume to: Staff/Emp, TWC, (REF: SE) 300 Interstate North Parkway, Atlanta, GA 30339.

Senior Consultant-Responsible for a broad range of Business Solutions Group (SAP R/3) consulting activities working with current and prospective clients. Duties include sales negotiations and presentations, development of business plans and presentations; manage development of complex documents; develop and manage engagement workplan and execution; select, modify and use consulting tools; troubleshoot problem areas; prepare and coordinate development of quality deliverables; participate in the development and delivery of local training programs. Requirements include a Bachelor's degree or equivalent in Computer Science, Engineering or related field and three years of experience in the job offered or related field of implementation of manufacturing or business applications; or in the alternative, five years of experience. Applicants must have unrestricted authorization to work in the United States. Salary $105,000/year. 40 hours/wk. Respond with two copies of resume to Case #20004257, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114.

PROGRAMMER ANALYST
Analyze, dsgn. & implement systems. Dvlp. apps. & technical & user-level documentation. Duties include: (i) preparing schematics, data models & prototypes; (ii) determining appropriate new & adapted hardware & software; (iii) determining & dsgng. data base level changes for enhancements of new programs; (iv) creating GUI forms, queries, functions, menus & on-line reports; (v) dsgng., coding & testing individual programs, reports, queries & filters; & (vi) testing & debugging programs. B.S. in Comp. Sci., Engrg., Bus., Physics or Math plus 3 yrs. exp. in position offered or as Software Engr., Systems Analyst, or Software Consultant rqd. Must have working knowledge of Lotus Notes, Lotus Script, Java, Java Script & HTML languages; SOL Server, Oracle, DB2 or MS Access databases; & Windows operating system. High mobility preferred. 40 hrs/wk, 8 a.m. - 5 p.m., $70,000/yr. Qualified applicants report/submit resume to: Thomas Dembosky, Mngr., Indiana Job Center, 350 North Fourth St., Indiana, PA 15701. Refer to Job Order No. WFB150447.

IT careers

COMPUTER PROFESSIONALS

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We'll provide you with a stimulating supportive environment, attractive salaries and benefits including: Tuition Reimbursement, 401K Savings Plan Company Matched, Life, Health, Dental Plan, On-Going Technical Training and Employee Assistance Program. Please forward your resume to: Tom Culmone, Staffing Manager, Dept 219, COMPUTER HORIZONS CORP. 49 Old Bloomfield Avenue, Mountain Lakes, New Jersey 07046-1495. Call 973-299-4000 or 1-800-321-2421. Fax: 973-331-1632. E-mail: jobs@computerhorizons.com (in MS Word format only, please). An Equal Opportunity Employer M/F.

COMPUTER PROGRAMMER (6 openings). Design and construct MVS mainframe software applications in a CICS/DB2 environment using COBOL II, TSO/ISPF and and JCL. Knowledge of VASM and IMS is also required. Must be familiar with Panvalet, FileAid, Xpeditor and SmartTest. Debugging, problem-solving and trouble-shooting skills are mandatory. Candidate must also have knowledge of MicroFocus Workbench, ADW CASE technology, Magic RAD, Btrieve RM and Oracle 7.0. Must be willing to relocate within the U.S. on a project-by-project basis. Must have BS or foreign degree equivalent in Computer Science, Eng./Tech. or related and two (2) years' work experience in the job offered, or two (2) years experience as a Software Engineer, Analyst, or any suitable combination of education, training, and experience, or related. Hrs: 9a-5p, M-F, $68,848 per yr. Apply to Georgia Dept. of Labor, Job Order #GA6937858, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Dept. of Labor Field Service Office.

Computer Systems Hardware Analyst. Responsibilities include analyzing data processing requirements to plan data processing systems; planning layout and installation of new systems; troubleshooting and hardware compatibility testing; providing customer service and technical support to users. Requires a Master's degree in Electrical, Electronic or Computer Engineering. Send resume to Ms. Alice Wei, PCWarehouse, 6505A Basile Rowe, East Syracuse, New York 13057.

Software Co. in NJ seeks to fill Software Engg Positions - Must have Masters & 2 yrs exp or Bach & 2-5 yrs exp in dsgng, dvlpg & testing s/ware applics using VB, C, C++, Java, ASP, CGI, SOL, Oracle or SOL Server. Respond by resume to HR Dept., Innospire Systems Corp, 267 Amboy Ave, Ste 14A, Metuchen, NJ 08840.

Software developer in Win32 application development sought by electronic parcel delivery company in Newton, MA. Must have B.S. in Comp Sci, Math, Engg, Physics or technology and 3 yrs experience in any software development occupation. Respond by resume to: Halli Salz, HR Mgr ATA Bok, Inc., 29 Crafts St., Suite 300, Newton, MA 02458.

Several computer related positions for large telecom and computer services company in the international airline telecom industry. See www.sita.com for details. Positions in the New York and Atlanta office. Send resume to: Ms. CJ Vanner at SITA INC at 3100 Cumberland Blvd., Suite 200, Atlanta, Georgia 30339.

IT PROFESSIONAL who is capable of leading group of IT engrs to support all n/work & servers in NJ, CA offices & China mftr to project teams. Maintains, implmts & troubleshoots online Accware 3.2, MS NT Backoffice systms, MS Exchange server, DSN server, IIS server, DHCP server, SOL server & Novell Group Wise Admin, systm Backup & Disaster Recovery Plan, Internetworking Dsgn, Router & Switches. Configure, N/work Traffic monitoring, H/ware installation, Info Systems Solutions Research & Eval. Please send resume to HR Dept, Aspect Computer, 21 Worlds Fair Dr, Somerset, NJ 08873. Fax: (732) 563-0662.

PROGRAMMER-ANALYST, FUND ACCOUNTING: Uses software development life cycle methodology in the development of computer programs for a Series Fund Accounting application system in a large financial organization, using Oracle tools in a client server environment. B.S. in Computer Science or Business, plus two years experience in the duties of the job offered. 40 hours per week. Send resume to: Western Reserve Life Assurance Company of Ohio, 570 Carillon Parkway, St. Petersburg, Florida 33716, Attn: Denise Howell, Manager, Client / Server Applications Development.

Statistical Programmer--Biostatistics. Forest Laboratories, Inc. develops, manufactures, and sells both branded and generic forms of ethical pharmaceutical products. Currently our company seeks a Statistical Programmer-Biostatistics. Qualified applicants must have a Master's deg. in Biostatistics or rel. disc. & exp. with Statistical Analysis Software (SAS). Exp may be gained through educ. or emp. Send res. to: Forest Labs, Inc., Attn: Jennifer Schaefer, 909 Third Avenue, New York, NY 10027. Code JS-HL.

Graphic Designer--Designing and coordinating advertisements, corporate logos, and laying out for photographs for corporate and individual clients. Must have Bach deg in arts and knowledge of relevant software. Fluency in Japanese. Respond to HR Dept., Knowex Solutions, Inc., 65 Broadway, 9th Floor, New York, NY 10006.

Web Developer, Sr. Analyze user rqmts, procedures & problems to dev. enabling software systems. Research emerging web technologies, inc. SOAP, XML, CORBA, Enterprise, JavaBeans. Address & analyze detailed steps to design, implmt & test n-tier web portals across platforms. Focus on use of ASP, SOAP, XML, XSL. Prepare tech. documentation of devt. process. BS in Comp Science or equiv. Resume to: MTA Int'l, 50 E. 42 St, #708, NY, NY 10017.

Database Design Analyst: Data analysis/data modeling, customization and enhancement of software applications, system design and development, test plan preparation and quality assurance procedures, user training and documentation in Windows/95/NT, IBM mainframe environments using Visual Basic, Visual C++, CGI, HTML, Active X and Java. MS in Comp Sci. (or equiv). Send resume: HR Dept., ICICI Infotech, Inc., 450 Raritan Center Pkwy., Edison, NJ 08837.

An international consulting firm is seeking: Programmer Analyst. Software Engineers and Database Administrators. Exp with a variety of hardware and software packages. We offer a competitive salary, commensurate rate with exp., plus a comprehensive benefit package, including 401K, health, dental and education assistance/reimbursement. Send resume to: Primesoft, LLC, One Lawson Lane, Burlington, VT 05401. Tel: 802-658-7600 /Fax: 802-658-1090 Email: recruiting@primesoftgroup.com

Multiple full time positions open for exp'ed Prog/Analysts and S/W Engineers skilled in some of the following: VB, HTML, Java, COM, IIS, ASP, Oracle, Developer 2000, Sybase, Internet/Wireless Technologies, Windows NT, UNIX, database admin, UNIX admin etc. All positions require a BS/MS in CS/Engineering (any branch) or related field (or its foreign equiv. in edu and exp). Highly competitive salary. 60% traveling involved. Send resumes to: InfoSmart Technologies, Inc. : 385 Leatherman Ct. Alpharetta, GA 30005

Computers Systems Analyst sought by Software & Computer Program Company in NYC. Must have Bach in Computer Engineering or Comp. Science and 1 year s/ware exp including Perl+, Java+, Javascript, Unix. Please respond to: CyCom Technologies, 312 5th Avenue, #701, New York, NY 10001.

Senior Implementation Consultant: Will be responsible for performing technical and consulting activities including system design and implementation. Will assist in facilitating customers' implementation activities in the area of foundation building, customer education, and education planning, and project planning and execution. Will execute product implementation tasks, project level implementation strategies, and participate in program activities (C-FIT, Pr/CAP, and others). Will also aid in user learning curve compression, mentor implementation associations, and document methodologies and case studies. Job is in Boca Raton, Florida. Requires a Bachelor's degree in Computer Science, Electrical/Mechanical Engineering, Physics, Mathematics or equivalent; and 2 yrs. in the job offered OR 2 yrs. experience in CAD/CAM consulting or development. Candidate must also possess demonstrated expertise supporting Product Data Management (PDM) products. Salary: $59,950/year; M-F 9am-5pm; 40 Hrs. Per Week. Send Resume to Workforce Program Support/A.L.C. Unit, P.O. Box 10869, Tallahassee, Florida 32302-0869; Attn: EH., FL-2150577.

Assoc. Object Technology Consultant--provide technical consultancy to clients on/off site. Determine customer requirements. Participate in full lifecycle of software development. Provide training courses and seminars. Work with client through all phases of development. BS or equiv in Computer Science or related field, plus 2 yrs exp in OO Technology, Send resumes to: Doreen Nichols, HR Manager, IONA Technologies, 200 West Street, Waltham, MA 02451

Database Administrator for automotive component manufacturer to develop and implement procedures for UNIX and Oracle database installations and upgrades. Requires minimum three years experience developing and implementing procedures for UNIX installation configurations and upgrades, including developing shell scripts in Digital UNIX, and in performing system internal testing and disaster recovery planning. Requires B.S. in Electronics Engineering or equivalent. Send resume to H.R., McCord Winn Textron, 645 Harvey Road, Manchester, New Hampshire 03103.

Engineers/Programmers/Technical Support personnel needed. Boston, MA based company has several senior and entry level positions available. Oualified candidates must possess a BS/MS and/or relevant work experience. Work with some of the following: C, C++, Pascal, Embedded Systems and Motorola Assembly. Fax resumes to P&E Microcomputer Systems at (617) 353-9205, or email to resumes@pemicro.com.

INFORMATION TECHNOLOGY DIRECTOR: Oversees integration, networking and web accessibility of large multi-state information systems through data warehouse management, including document imaging. Travels to network sites around U.S. Must have B.S. in Computer Science (or equivalent) and two years experience in job offered. $70-90,000/year; 50+ hr/wk, Monday - Friday; "on call" for system failures. Send resume to Attn: Debra Guild Human Resources, 21st Century Oncology, Inc., 2234 Colonial Blvd., Ft. Myers, Florida 33907.

Software maintenance Programmer-40hrs/wk, 9:00 a.m.-5:00 p.m., $47,000/yr, Provide customer maintenance and support, customization and implementations using VB Script; technical support to VARS. Must possess a Bachelor's degree in Engineering or the equivalent and two (2) years experience in the job offered or two (2) years experience in a related occupation (Technical Designer, Design Engineer, Engineer or equiv.) Please send 2 resumes to: Case #20002520, Labor Exchange Office, 19 Staniford St. 1st Fl., Boston, MA 02114.

Programmer-Analyst. 2 needed immed. to develop, code, & implement info. systems and integrate with databases. Know Win NT, HTML, UNIX, SOL. $75K/yr. Bachelor's and 2 yrs. exp. in any IT field. Res. to GST, 1005-E Village Greenway, Cary, NC 27511 or email gstusa@hotmail.com

WEB DEVELOPERS (NJ): Develop and implement high volume Web-based application using ASP, VB 6, COM+, SOL 7.0, Java Script and Perl. BS in computer science. Good pay plus good benefit. Send resume to HR, Vanguard InterActive, Inc., 140 Sylvan Avenue, Englewood Cliffs, NJ 07632, or email lisa@vanguardinteractive.com

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Full-time BIOS Engineer. Responsible for BIOS customizations, isolating BIOS problems, and BIOS releases using C/C++ and Assembly Language. Establishes customer relations. Writes and maintains technical documents. Works with assembly language training programs, development system, test system, and any computer architecture and VLSI design and any computer hardware and software necessary to reproduce customers' problems. Must have a Bachelor's degree in Electronics Engineering, Computer Science or related field. Must have 2 yr of experience in job offered or a position with the same duties. Work background must have included VC/BC, Xilinx, FPGA and SNMP/TCP/UDP/IP Salary:$58,234/yr. Send resume to: Nanda Chheda, AMI, 6145-F Northbelt Parkway, Norcross, GA 30071.

Systems Engineer: provide application support for PC and LAN, maintain and improve company web site, administer database, specify architecture systems and implement full life-cycle development of e-business application. Req. BS or equivalent in CS, CIS or MIS with proficiency in C++, HTML and Visual Basic. 8-5, 40hr/wk. $49,300/yr. Send resume to Orientiques, Inc. 700 Miami Circle NE, Atlanta, GA 30324, fax: 404-467-8101.

Software Engineer. $70K/yr; 8a-5p; 40 hrs/wk. Dsgn, dvlp & implmt s/ware systms w/h/ware product dvlpmt, applying principles & techniques of comp sci or engg. Analyze s/ware reqmts to determ feasibility of dsgn within client constraints & needs. Utilize C/C++, GUI & object-oriented applics on Win or Unix platform. US Masters deg or equiv foreign deg in Comp Sci or Engg or Mgmt Info Systms. One yr exp in job offd or related occupations of s/ware applic engg. Please send resume to: Murali Golla, President, Cyber Reflections, Inc., 735 Melbourne Trail, Alpharetta, GA 30004.

Senior Database Administrator needed to design and develop Business Applications using Oracle, PL/SOL, C and Shell programming under UNIX environment and to perform Database Administration tasks. Must have MS in Computer Science/Engineering and 2 years experience or 5 years with a Bachelors Degree. Reply to: S. Nemani, Princetec, Inc., 4365 Rte. 1 Suite 110, Princeton, NJ 08540.

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IT CAREERS

Software Engineer. Analyze, design and implement object oriented solutions for digital extraction of voice files from commercial dictation servers. Design and implement software applications for monitoring a remote machine using Visual C++ and Microsoft. Implement automatic e-mail alert in applications running on remote machines. Coordinate different applications through Windows Messaging, COM and automation technologies. Requires: Bachelor's degree in Engineering, Comp. or Info. Science or related field. 5 yrs. exp. in the job offered or as a Computer Engineer or Systems Analyst. EOE. 40 hrs/wk. Salary: $75,000/yr. Send resume (no calls) to: KB, HealthScribe, Inc., 403 Glenn Drive, Suite 10, Sterling, VA 20164.

Software Engineers to Design, develop and test state of the art telecom software for Voice Over IP, Voice Over ATM using OO and Structured Methodology in C, C++, CORBA and JAVA; design, develop and test call processing, SS7 (ISUP & MTP) and feature development for integrated on demand service (Voice, multimedia etc) over IP/ATM Switch. Require: M.S. in CS or Engg(any branch)with 3 yrs exp. A B.S. (or foreign equiv.) in any of the above with 5 yrs of relevant progressive exp will also be accepted. 80% travel required to client sites within the US. Salary $60-80K/year, full time. Contact Soft Place Technology, Inc., 1301 Deer Trail Road, Birmingham, AL 35226.

Full-Time ASIC Design Engineer to design test and debug next generation ASIC for the company. Architecture design and coding using Verilog HDL. Job involves designing and debugging modules of ASIC using Verilog Simulation tools. Synthesis and timing analysis using Synopsys tools. Development of test plan for the design. Coordinating with hardware board design team for the development of PCI/SCSI controller or Motherboards based on ASIC developed. Must have a Bachelor's degree in Electronics Engineering or foreign degree equivalent. Must have 2 yrs of experience in job offered or a position with same duties. Salary: $58,234 - $70,000/yr. Send resume to: Nanda Chheda, A.M.I., 64145-F Northbelt Parkway, Norcross, GA 30071.

SOFTWARE ENGINEER. Researches, designs, and develops computer software systems, in conjunctions with hardware product development, for industrial, commercial, and business applications, applying principles and techniques of computer science, engineering, and mathematical analysis. Master of Science in Computer Science, Engineering, or Math-related and 2 years experience required. Must be able to travel and work at client site for many months at a time. Included in the 2 years' job experience must have 2 years' experience with C, C++, Windows SDK VC++, COM, JAVA, ORACLE. $66,920/yr.

Apply by resume to Murali K. Saddala, President, 3569 Habersham-at-Northlake, Tucker, GA 30084.

Software Engineering positions available in Clifton Park, NY to design and implement algorithms, standards and techniques in video and image processing, compression and transmission. MS in Comp. Sci., E.E., and exp. in video compression techniques. Send resume to HR Dept., On2.com Inc., 375 Greenwich Street, New York, NY 10013

Software Engineer

Apply professional-level knowledge of Computer Science to design and implement CRM Optimization software. Responsible for coding programs according to functional specifications, documenting the process of development projects and testing program performance. Must have an M.S. degree in Computer Science or related & 1 year of experience in related field w/ability to use Java, C++, COM, mutilthreading and network programming. Servlet, JSP, Applet, Javascript, HTML, XML, XSL and SQL.

40.0 hr/wk 9:00-6:00

Applicants send resume to:
Witness Systems, Inc.
300 Colonial Center Parkway
Roswell, GA 30076
Attn: Karen McConnell
Ref# 2001O

SOFTWARE ENGINEER. Researches, designs, and develops computer software systems in conjunction with hardware product development, for industrial, commercial, and business applications, applying principles and techniques of computer science, engineering, and mathematical analysis. Master of Science in Computer Science, Engineering, or Math-related followed by 5 years' of Progressive Software Engineering Experience). Must be able to travel and work at client site for many months at a time. Included in the 2 years' job experience must have 2 years' experience with C, C++, Windows SDK, VC++, COM, JAVA, ORACLE. $66,920/yr.

Apply by resume to Murali K. Suddala, President, 3569 Habersham-at-Northlake, Tucker, GA 30084.

Full-time Senior Product Support Analyst. Provide support to both international and external customers through product implementation, problem analysis, application testing, sales support, and initial and recurrent customer training. Conduct Gabriel Software trouble report and testing. Conduct the analysis, definition, documentation and testing of application enhancements. Ensure that the group modifies the Gabriel Software based on functionality specifications. Provide implementation on link connectivities and ensure system integration with related services. Investigate reported problems and discrepancies. Determine requirements and changes to system processing that may be necessary. Must have four years of experience in the job offered or position with same duties. Salary: $45,000.00. Send resume to Carl Vanner at SITA INC, 3100 Cumberland Blvd., Suite 200, Atlanta, Georgia 30339.

Senior Software Engineer-Design and develop next generation E-commerce products. Work with the latest distributed object technologies and as a senior contributor for one of the company's E-commerce product lines. Interact with Quality Assurance, sales, product, client services and customers to understand their requirements and implement world class solutions. Requirements include a Master's degree or equivalent in an Engineering discipline, Computer Science or related field; or equivalent Bachelor's degree or equivalent and five years of progressively responsible experience in job offered or related field of software development. Applicants must have unrestricted authorization to work in the United States. Salary $84,000/year. 40 hours/wk. The advertisement will include the following statement: Respond with two copies of resume to Case #20004256, Labor Exchange Office, 19 Staniford St., 1st Fl., Boston, MA 02114.

Software Developer (Software Engineer) (Atlanta, GA): Responsible for research, analysis, design, development of architecture service components and systems to support object oriented software application development. Use C++ to program and unit test architecture components in UNIX environment. Analyze application designs and code to determine feasibility and compliance with design and development standards. Provide ongoing support of technical architecture system and software applications. Must be available to provide support for production application issues as needed 24 hours per day, seven days per week. Must have Master's Degree in Computer science or related field OR will accept Bachelor's Degree in Computer Science or related field and two yrs experience as a software developer or software engineer in lieu of Master's Degree. Educational or work background must include one year of experience each in C++ and UNIX. Experience may have been obtained concurrently. Must have legal authority to work in the U.S. Send resume to: N. Bression-Page, SI Corp. (REF: SoftDev) 3390 Peachtree Road, N.E., Ste. 1700, Atlanta, GA 30326

COMPUTER PROGRAMMER (6 openings). Design and construct MVS mainframe software applications in a CICS/DB2 environment using COBOL II, TSP/ISPE and JCL. Knowledge of VASM and IMS is also required. Must be familiar with Panvalet, FileAid, Xpeditor and SmartTest. Debugging, problem-solving and trouble-shooting skills are mandatory. Candidate must also have knowledge of MicroFocus Workbench, ADW CASE technology, Magic RAD, Btrieve RM and Oracle 7.0. Must be willing to relocate within the U.S. on a project-by-project basis. Must have BS or foreign degree equivalent in Computer Science, Eng./Tech. or related and two (2) years' work experience in the job offered, or two (2) years experience as a Software Engineer, Analyst, or any suitable combination of education, training, and experience, or related. Hrs: 9a-5p, M-F, $68,848 per yr. Apply to Georgia Dept. of Labor, Job Order # GA 6937898, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Dept. of Labor Field Service Office.

COMPUTER PROGRAMMER (6 openings). Design and construct MVS mainframe software applications in a CICS/DB2 environment using COBOL II, TSO/ISPF and JCL. Knowledge of VASM and IMS is also required. Must be familiar with Panvalet, FileAid, Xpeditor and SmartTest. Debugging, problem-solving and trouble-shooting skills are mandatory. Candidate must also have knowledge of Micro-Focus Workbench, ADW CASE technology, Magic RAD, Btrieve RM, Borland C and Oracle 7.0. Must be willing to relocate within the U.S. on a project-by-basis. Must have BS or foreign degree equivalent in Computer Science, Eng./Tech., or related and two (2) years' work experience in the job offered or 2 years as a Software Engineer, Analyst, or any suitable combination of education, training, and experience, or related. Hrs: 9a-5p, M-F, $68,848 per year. Apply to Georgia Dept. of Labor, Job Order #GA 6937895, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Dept. of Labor Field Service Office.

Integrated Computer System Management Inc. Consulting Comp. is seeking Software Engg. w/MS & 1 yr exp. or its equiv. & Progg. Analysts w/BS deg. & 2+ yrs exp in the foll. areas. Traveling/ Relocation will be required anywhere in U.S.A.

Oracle DBA/Developer, Graphic Design, ASP, HTML, JavaScript, Photoshop, WEB, COBOL/400, RPG/400, CL/400, DB2/400, SOL/400.

Apply w/resume to Attn: Recruiter 1637 A Hillside Ave, New Hyde Park, NY 11040, Fax (516) 616-4199, E-mail: Resumes@icsm.com

Sr. Developer/Analyst wanted in New York office of International Investment Bank to serve as lead developer and project manager for finance-related application development including hands-on back-end programming in Visual Basic and SOL. Produce COM components in Visual Basic for data extraction and conversion from external database, XML files and text files. Write SOL scripts and store procedures optimized for larger data operations. Confer with business analysts on data analysis and interpretation. Manage and maintain database schemes and nightly batch processes. Deploy DLLs to IIS and store scripts and programs in Clearcase version control management system. Oversee the work product of developers and business/ analysts, as required, on a project by project basis. Provide support to existing systems. Write technical reports and software documentation. Must possess a Bachelor's degree in Computer Science or Engineering and have at least 2 years experience in the job offered or 2 years as a Project Manager, Assoc. Systems Engineer or Production Manager utilizing SOL. The employer will accept four years of progressively responsible work experience in the job offered or a related field in lieu of the Bachelor's degree and two year experiential requirement. Send resume to: Nyree Arana at NYRecruiting @barcap.com referencing code "SD-A".

Amtex Systems Inc., a NY IT Co., is looking to fill up the following positions at their work sites:

Programmer Analyst/Software Engineer-Bachelors degree in engineering (any), math, science and two years of experience in the job (or) five years of experience in the job. Will accept Bachelors degree + five years experience in the field. Prefer the experience in the following skill sets: SAP R/3, ABAP, XML Tools, Visual Age, Xcelerate, Javascript, Cobol, AS/400, DDS, RPG III & IV, HTML, CL, ORACLE, ODBC, Developer 2000, Visual Basic, CICS, UNIX, C, C++ and JAVA.

Programmer Analyst: two years experience required and experience in skill sets mentioned above.

Software Engineer-Masters degree: Analyze, design, develop application systems in conjunction with hardware using skill combinations in SAP R/3, ABAP, XML Tools, Visual Age, Xcelerate Javascript, Cobol, AS/400, DDS, RPG III & IV, HTML, CL, ORACLE, ODBC, Developer 2000, Visual Basic, CICS, UNIX.

Send resumes to Amtex Systems, Inc., 50 Broad Street, #801, New York, NY 10004.

Senior Consultant-Commerce Applications. Responsible for designing, developing and implementing internet, intranet and extranet solutions, including e-mail messaging systems, electronic banking, messaging architectures, as well as intranet enabled data warehouses, web-based transaction facilities and internet and extranet security. Responsible for database programming using PL/SOL to create packages with stored procedures. Create servlets and Javaservlet pages on the webserver using Java which generate functional HTML pages for e-commerce applications. Create validation procedures within HTML pages using Javascript. Responsible for interacting with new and potential clients, visiting prospective clients and providing follow-up proposal information from a technical and business standpoint. Design and develop database solutions and develop distributed applications. Requires: Master's degree in Business Admin., Comp. or Info. Science, Eng. or related field. Graduate coursework must include classes in Database Systems and Systems Development. EOE. 40 hrs/wk. Salary: $90,000/yr. Send resume (no calls) to: Diane Tuccito, Answerthink, Inc., 817 W. Peachtree St., Ste. 800, Atlanta, GA 30308.

Manhattan Associates, Inc., a worldwide leader in supply chain synchronization systems is looking for analysts and developers to join our team $45K and up. Current openings include.

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Software Developers. Assist in defining sys scope & requirements, analyze use of existing sys requirements, & design & develop sys in light of future directions in hardware & software growth. Develop & direct design of software sys. MS in comp. sci, engg. or related tech. field. Technical knowledge of: RPG/400, C++, MicroFocus Cobol, Java or COM/VC++/Visual Basic demonstrated through edu. or exp.

Software Analysts. Design, develop, code, test & debug software applications. Req. BS in comp. sci, engg, or related tech. field. Exp. to include 6 mths using RPG/400. C++, MicroFocus Cobol, Java or COM/VC++/Visual Basic demonstrated through edu. or exp.

Quality Assurance Engineer: Plan, direct, and coordinate design and development software test procedures, plans and automated scripts. Prepare test recommends and document procedures for product design through production. Evaluate test equipment used to perform quality checks. Document defects. Maintain defect tracking system. Req. MS in comp. sci, engg, or related tech. field or management field.

Senior Software Engineers. Develop & direct software programming, documentation & sys testing procedures for software program applications. Req. MS in technical field (comp. sci, IT, math, engineering, physics, etc) & 3 yrs exp in programming, analysis, design, development or tech leader or a BS in a technical field & 5 yrs exp in programming, analysis, design, development or tech leader. Exp. to include at least 6 mths with full life cycle development using C++, Java, MF Cobol, RPG/400 or COM/VC++/Visual Basic.

Database Administrator: Database implementation and support to users on database applications across platforms utilizing knowledge of Unix and Shell programming as well as SOL, PL/SOL. Req. Bachelors or equivalent in a technical discipline (computer science, information technology, math, engineering) or the sciences.

Resumes to: J. Lurey, Manhattan Associates, 2300 Windy Ridge Pkwy, 7th Fl. North, Atlanta, Georgia 30339

Software Business Analyst (Charlotte, NC): (Multiple Positions) Responsible for business analysis of complex processes & interactions for banking software products & project lifecycles. Recommend technically feasible business solutions to meet client needs. Write complete & consistent set of specifications for software product, including functional specifications, user interfaces, interface formats, mapping & logical data modeling. Prepare organization-wide corporate templates, business validation rules, indicative screen shots & other documentation describing complex processes using clear written or spoken English. Assist in the design of core product by evaluating high-level business requirements and creating specifications that clearly describe to development team how product will function and design. Assist consultants with Customer specific work, including direct consultancy. Must have Bachelor's Degree in Business Administration, or foreign degree equivalent. Must have one yr experience in job offered (Software Business Analyst) or one yr experience in a position involving business analysis of banking software applications. Experience may have been obtained concurrently and must include: (i) 1 yr experience in S.W.I.F.T. format specifications; (ii) 1 yr experience in logical data modeling; and (iii) 1 yr experience in Windows 95/98/NT or Windows Operating Systems and MS Word. Must be able to write grammatically correct English. Frequent travel required. Must have legal authority to work in the U.S. Send resume to: A. Dugan (REF:SBA), SI Corporation, 2815 Coliseum Centre Drive, Charlotte, NC 28217.

Full time Associate Software Engineer. Responsibilities include: Design, develop and implement leading edge Internet based transaction processing products utilizing state of the art web technology, transaction processing middleware and distributed databases; utilize Visual Basic, UML, WFC, JAVA, ActiveX, DHTML, XML, JavaScript, Active Server Pages, HTTP, SSL, COM, C++, Oracle, SOL, Rational Rose Booch, JDBC, RMI, Domino WebServer, Lotus Notes 4.5, Windows NT and 98 and Unix to lay the foundation and structure the design four tier products; integrate technologies and test products for symmetry; and serve as technical liaison with in-house and client Project Managers. Must have an Associate's Degree or its foreign/educational equivalent in Computer Science, Engineering or related field and three years of progressive experience as a Software Engineer or Systems Analyst, or a Bachelor's Degree or its foreign/educational equivalent in Computer Science, Engineering or related field and one year of progressive experience as a Software Engineer or Systems Analyst. Must have proof of legal authority to work in the United States. Salary: $67,000/yr and up, commensurate with experience. If interested, submit resume in duplicate to:

Ms. Nancy Tomaselli
Fundtech Corporation
157 Technology Parkway, Suite 100
Norcross, Georgia 30092

Systems/Network Engineer-Coordinate the architecture and design of the company's OS/390 and Enterprise systems. Responsible for the design, configuration, and support of host Network software. Install, implement, and maintain OS/390 systems software. Participate in the evaluation and selection of OS/390 based software and host attached hardware peripherals. Act as a liaison and consultant for the OS/390 Systems Support, when required for internal coordinated projects and for customer services. Provide primary support in the evaluation of OS/390 resources requirements in an outsourcing environment. Provide primary support for technical recommendations of OS/390 features and an expanding role in the area of Enterprise requirements in an outsourcing environment. Provide subsystem performance support and backup support. Special knowledge of SNA/TCP/IP network architecture/ design and technical project management. Requirements include a Bachelor's degree or equivalent combination of education and work experience in Computer Science or related field and five years of experience in job offered or related field of OS/390 MVS Systems Programming. Applicants must have unrestricted authorization to work in the United States. Salary $95,000/year. 40 hours/wk. Respond with two copies of resume to Case #20003645, P.O. Box 8968, Boston, MA 02114.

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ITBC, Inc. seeks Programmer/ Analysts available to relocate to various unanticipated worksites across the United States.

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Software Engineer sought by window covering importer in Cerritos, CA for company MIS system. Resume to H.R. Dept., Custom Craft Co., 13707 Midway St, Cerritos, CA 90703.

Computer Professionals

Lan Lab Communications has at least 10 openings for computer technician analysts, programmer/ systems analysts, software engineers for both entry and senior levels. Candidates with following skills are plus: install & maintain network operating systems, database application, MSOffice, NT 4.0, TCP/IP. Degrees preferred but not necessary. Send resume to: 3176 Pullman St., Ste 115, Costa Masa, CA 92648. EOE.

Computer Programmer sought by company who design and program internet applications for e-business located in Santa Fe Springs, CA. Must have Masters Degree in Computer Science. Send resume to: HR Director (REF: JB 01106) e21 Corporation, 10012 Norwalk Blvd #120, Santa Fe Springs, CA 90607.

Channel Sales Representative wanted by Massachusetts-based Software Development & Consulting Co. for its San Ramon, CA office. Must have Bachelor's degree in Computer Science, MIS or related field, as well as 1 year of technical sales experience. Respond to: Job Code #5249, HR Dept, Cognos Corporation, 67 South Bedford St, Burlington, MA 01803.

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Software Engineers and Other Information Technology Professionals

Employee-owned Science Applications International Corporation (SAIC), a Fortune 500 company, provides high-technology services and products to government and commercial customers. SAIC and its subsidiaries have estimated annual revenues of over $5.5 billion and more than 41,000 employees at offices in over 150 cities worldwide. Currently, we have multiple openings at various U.S. locations for SOFTWARE ENGINEERS AND OTHER INFORMATION TECHNOLOGY PROFESSIONALS.

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Programmer/Analyst: Develop and produce source code required in the operation of company's CADWorx software products used in the design and drafting of piping and instrumentation in the power and process industries using C++, AutoCAD and Database programming. Provide support for CADWorx software products. BS in Comp Sci, Comp Engg, or Engg Tech & 6 mos. exp. Send resume: HR Dept., Coade, Inc., 12777 Jones Rd., Suite 480, Houston, TX 77070.

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Resp for creating, supporting & managing Progress Database; installing, upgrading & maintaining Progress. Webspeed, Mfg/Pro and Q-ling applic's; system configuration; system security. Req's Master's deg in Ind'l Eng'g field, Comp Sci. or foreign equiv OR Bach deg in Ind'l Eng'g or Comp Sci & 3-5 yrs exp. w/Progress and Mfg/Pro. Send resume to Maria Martinez, Johnson Controls, Inc, One Prince Ctr, Holland, MI 49423.

Network Administrator wanted by Diamond Wholesaler in Chicago, IL. Must have Bachelor's Degree in Comp. Sci. Respond to: International Diamond & Jewelry Corporation, 29 East Madison Street, Chicago, IL 60602.

Software Engineer wanted in Houston, TX. Respond to: HR Dept., KKL, Inc., 9430 Harwin Dr., Ste #L-P, Houston, TX 77036.

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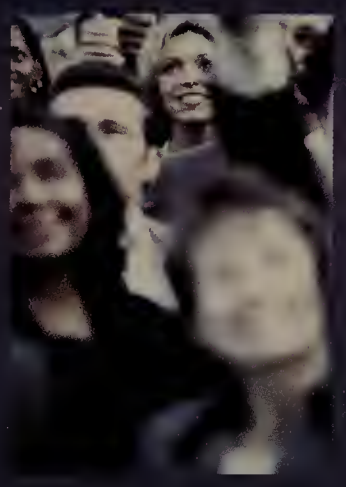

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- Internet/Intranet
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- Client Server
- Midrange
- Mainframe

Positions require a Bachelor's degree or the equivalent in education and experience as well as experience and/or training in these skills. Excellent pay and benefits. Mail resume to: HR Department-REB3, American Information Technology Corporation, 118 Third Avenue SE, Suite 630, Cedar Rapids, IA 52401.

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- UNIX
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Positions require a Master's degree (or Bachelor's degree plus five year experience) as well as experience and/or training in these skills. Excellent pay and benefits. Mail resume to: HR Department-REB2, American Information Technology Corporation, 118 Third Avenue SE, Suite 630, Cedar Rapids, IA 52401.

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IT Professionals

AT&T has multiple openings (all levels) in information technology fields. Positions include Software Engineers, Systems Analysts, Network Engineers, Web Masters, Database Administrators, Researchers, Technical Managers, and other IT positions. Openings nationwide including Arizona, North/Central New Jersey, New York, California, Colorado, Florida, Georgia, Missouri, North Carolina, Ohio, Pennsylvania, Texas, Virginia and Washington. Some positions require a Bachelor's degree, some a Master's, others a Ph.D. Some require experience; others are entry level. Interested candidates should apply on-line at:

www.att.com/hr

or mail resume with cover letter to
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IT Careers in Financial Services

Just as the InfoWorld Test Center has shifted away from reviewing boxes and tools to technology in general, so too has the world of financial services information technology. The technology is what brings the expertise of brokers, bankers and analysts to their customers, as well as sharing knowledge throughout these firms. The result is that most financial services firms are looking for people with experience in large-scale implementation — identifying how varied technologies can work together behind the scenes of what web-enabled technology is providing to customers and suppliers.

Kemper Technology Services — Long Grove, IL

Jack Scott, president of Kemper Technology Services, has been working the financial services/technology angle for more than three decades. "One of our key challenges for the future is how to distribute ourselves and our knowledge to match our user community, and that takes on a number of dimensions," says Scott.

The result is a need for technology employees who have deep technical skills and who can work closely with the distributed business activity. "To respond to this environment, we have a dual path for technologists — one that is linked more closely to the business and the other as senior level, deep technologists," Scott explains. "This dual track recognizes the increasing complexity of the systems we're developing."

The deep technology positions are mainly available in Long Grove. "These positions range from entry-level to senior architects, application architects and project managers. We also have positions available in Jacksonville and Jersey City. These positions will consist of developers and business analysts and will assist us in aligning more closely with business offices across the country," says Scott.

Kemper currently is retooling systems for web delivery to include new business management tools, large-volume delivery capability and data management. Web sphere and Java are being used as the basis for much of the development. "The data management aspect includes incorporating different data models and implementation of middleware that will provide access and consistency across a heterogeneous environment," Scott says

"Kemper Technology Services provides diversity of work for employees and includes a commitment to technology. We also offer excellent benefits and an IT-focused employee development program," says Scott. "Kemper is an organization with an exceptional reputation and a long history of success in a stable environment."

OpenLink Financial, Inc. — Mitchel Field, NY

When financial services and energy marketers look for technology, they often turn to OpenLink, one of the industry leaders in trading and risk management systems. "Our software handles the entire trade life-cycle management process," explains Diane Montaruli, vice president of human resources. "It offers extensive cross market capabilities, and provides our customers with a flexible, scalable and best-of-fit solution."

OpenLink's lead products are Endur for energy markets, and Findur for financial markets. With a diverse set of top-tier clients worldwide, OpenLink services mega utilities, energy marketers, central banks, settlement banks and trading houses. "Our clients represent the top of the spectrum in each of the markets we serve and include such names as Dynegy, KeyCorp, Coral and Bank for International Settlements," says Montaruli.

OpenLink's corporate headquarters is located in Mitchel Field, just outside New York City, and has regional offices in Houston, Texas and London. Project management, client support and technical development positions are available at all three locations. The business is seeking IT professionals with C/C++ language experience, Java, Web Logic, EJB and database skills. "Ideally, we are seeking employees who have a balance of technical and marketplace experience," says Montaruli. "That's important for our product development and for the clients we support."

"Here you'll be a software developer for the markets you hear about every day in the news — energy, commodities, foreign exchanges, derivatives. You will be at the pulse of what is going on in the world today, as our clients are constantly pushing us to be on the leading edge," adds Montaruli. "We're a stable company whose aggressive growth has been based on sales, not projections."

PricewaterhouseCoopers — New York, NY

PricewaterhouseCoopers Technical Consulting Group performs two key functions for the financial services industry. First, it web enables internal and external relationships through technology. "For instance, financial firms may be looking for information and data to provide to customers and to share throughout the firm," says Nicholas Tsororos, associate director of recruiting for emerging and integrated technology efforts. "We create the underlying architecture that makes this possible."

Then, PricewaterhouseCoopers' team ties information, customers and employees back together through customer relationship management, ERP, human capital, technology management, and data warehousing systems to help customers gain full advantage of the systems they have in place. "We provide these capabilities to most of the major financial services — insurance, investment, capital management, commercial banking and brokerage firms," adds Tsororos.

"The combination of skills needed today do differ from what we needed just a year ago," Tsororos says. "We need people with experience in building systems, who have dealt with the end-users and been there and done that on some of the large-scale systems and new technologies — and know how to tie it all together." While many of the PricewaterhouseCoopers projects are based on UNIX, the IT teams also work with most of the major platforms. "We need strong knowledge of technology and business and people who can lead small or large endeavors while also doing the tasks."

In addition to a full-scale employee development process and online education, PricewaterhouseCoopers assigns a coach for every employee. The idea is to help employees with their current assignments, but also to develop skills and experiences needed to gravitate their careers and the service the firm provides to clients. "We have a framework that allows you to work in any of six areas or a multitude of the six," says Tsororos. "I usually advise people to work in two or three at least to provide some balance."

IT careers

For more job opportunities with financial services firms, turn to the pages of ITcareers.

- If you'd like to take part in an upcoming ITcareers feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.
- Produced by Carole R. Hedden
- Designed by Kevin M. Thomas

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Cisco,
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Microsoft at $314 billion — and its rate of growth is Cisco's biggest potential pitfall.

"There's one major problem with Cisco, and it has to do with size," says Frank Dzubeck, president of Communications Network Architects in Washington, D.C., and a Cisco analyst for many years. "You can't sustain growth rates because you get into the law of large numbers," which states that the larger a company grows, the slower the rate of revenue and earnings growth.

With slower revenue and earnings growth comes pressure on the stock. For a company that grows through acquisition — Cisco has purchased 71 companies since 1993 — that means a devaluation of its currency.

"I think Cisco's biggest challenge is Cisco itself," says a user at a large New England technology company. "With size comes a certain amount of inertia."

Inertia has set in on top- and bottom-line growth. Cisco's earnings between the first and second quarters were flat at 18 cents per share. Cisco says revenue growth will range from being flat to being down 5% in the third quarter, and flat in the fourth compared to the third.

Analysts were expecting earnings of 19 cents per share, and prior to the second quarter Cisco had beaten Wall Street estimates by a penny for 14 consecutive quarters. Revenue for the second quarter also missed Wall Street estimates by $250 million to $450 million.

Blaming economy

Cisco blames general economic conditions, dramatically decreased capital spending by service providers, a falloff in enterprise spending — particularly in the manufacturing vertical market — and increased inventories due to component shortages. Cisco was caught off-guard by some of these events.

"What has changed dramatically is the speed at which customers make and change decisions on both head count and capital spending," Chambers said during the second-quarter earnings conference call two weeks ago. For example, one such customer decreased its capital budget to $800 million from $2.5 billion, he said. And spending among alternative service providers — competitive local exchange carriers — is off 40% from last year, he said.

"It's extremely difficult to avoid these types of [spending] slowdowns," Chambers said. Despite these challenges, Chambers said Cisco will grow 40% in fiscal year 2001 and can continue to grow at 30% to 50% over the next three to five years.

Inertia may also be setting in where the company's ability to develop and ship cutting-edge technology and products is concerned. Cisco had to extend lead times for its popular Catalyst 6500 switch from three weeks to three months due to component shortages, reportedly from supplier IBM.

Some users say the Catalyst 6500, which is a $5 billion line of business and helped Cisco garner the lion's share of the LAN switching market, is actually not market-leading technology but market-leading marketing.

"It seems that no matter what other hardware manufacturers do and invent, Cisco is the name that the people in my organization want to hear," says Raymond Santana, network engineer at the University of California, Davis, Medical Center in Sacramento. "In most cases, I cannot convince anyone that there is a better switch at lower cost than the Cisco 6500 series. I can't believe that Cisco is so far behind on the gigabit trail yet is still considered a top gigabit supplier."

Others, however, vouch for the capabilities of the Catalyst 6500 in a Forum exchange on Network World Fusion (www.nwfusion.com, DocFinder: 3055). "There is no better [switch]," two participants stated in the exchange.

Still, specific areas of pinpoint focus for the company — voice over IP, Internet routing and optical networking, to name a few — pose additional challenges for Cisco, users and analysts say.

A look inside

After more than six years of meeting or beating Wall Street expectations, Cisco two weeks ago fell short. Here's a look at some of the company's recent milestones and missteps:

Milestones:

Big money:	Twelve Cisco products accounted for $1 billion or more in annual bookings, led by the Catalyst 6500 line at $5 billion.
Bigger money:	Last year, Cisco joined General Electric and Microsoft as only the third company to surpass $300 billion in value.
Momentum:	Cisco's voice-over-IP strategy took root, with a 40,000-seat installation at Dow Chemical and an 8,000-seat network in New Zealand.
Dominance:	Cisco solidified its position in the enterprise as chief competitors exited the market or restructured from positions of weakness.

Missteps:

Delays:	Lead times for the Catalyst 6500 extended to three months from three weeks, reportedly due to a shortage of key components from IBM.
Hiccup?:	Reports surfaced that New Zealand was having problems implementing Cisco voice over IP. A New Zealand IS official downplayed the reports.
Surprise!:	Cisco was caught off-guard by the extent of the slowdown in capital expenditures by service providers and companies.
Gathering dust:	Cisco stocked up on components in light of shortages and commitments to suppliers, which ate into profits.

With voice over IP, Cisco likes to claim it is installing 2,000 IP phones per week. The company has signed on some major IP telephony wins: Dow Chemical, with 40,000 IP phones; the New Zealand Ministry of Social Policy, 8,000 phones; and Merrill-Lynch, which plans to have at least 8,000 IP phones in a new "PBX-free" campus.

But 2,000 phones per week is "a pebble in the lake" compared with the millions of handsets Lucent, Nortel and Siemens install per month, Dzubeck says. A report in the New Zealand press says the New Zealand Ministry of Social Policy had such a difficult time implementing its voice-over-IP network that it endangered the welfare of children because calls concerning abused youngsters couldn't go through.

Another user who claims to be knowledgeable about the Ministry's voice-over-IP network says it's actually two parallel IP networks — one running voice, another running data.

"This, I understand, has added to their costs significantly," wrote Richard Shorter, a technology manager at New Zealand Insurance, in an e-mail to *Network World*. "Unfortunately, I am not sure what the problem was that led them to this parallel network solution, as it appears that they had many problems during implementation."

Neil Miranda, technology director for the Ministry, says Shorter is incorrect.

"The man is off the wall," Miranda says. As for the child abuse issues, he strongly denies that disruptions in the voice-over-IP network endangered children at any time.

"It's wrong," Miranda says of the report. "It didn't put anybody at risk because the [child abuse] calls come from a call center. The call center had nothing to do with the IP network."

The voice-over-IP network handles an average of 150,000 calls per day, Miranda says.

Juniper challenges

In addition to voice over IP, Cisco faces a major challenge in its bread-and-butter business: routing. Juniper Networks is giving Cisco a run for the money in Internet core routing by beating the company to market with key technology — such as OC-192c interfaces — and stealing more market share every quarter and every year.

Cisco's share of the Internet core router market dropped from 80% in the first quarter of 2000 to 69% in the third quarter, according to Dell'Oro Group. Juniper's share almost doubled during the same time period, from 17% to 30%.

In an effort to stall Juniper's momentum, Cisco plans to roll out the 12400 Gigabit Switch Router in March. The 12400 will have a 320G bit/sec switch fabric and 10G bit/sec OC-192c line cards to compete with Juniper's M160, which has been shipping since last March.

"Juniper is taking market share, and Cisco has to address that," says Dave Passmore, research director at The Burton Group. "They're rolling out the 12400 to counter the M160, and they still have a terabit [routing] system in the works."

Terabit routing is still a ways off, but by the time Cisco's OC-192c router ships, Juniper will have already had a year's head start. Service providers usually remain loyal to their vendors, which means Cisco may have a difficult time winning back the customers and market share it lost.

Cisco seems to be gaining customers in optical networking, however. The company's ONS 15454 product — obtained through its $7 billion acquisition of Cerent — is one of 12 Cisco products with $1 billion or more in sales.

But Cerent is one piece of an optical array cobbled together via various acquisitions. Products obtained from the purchase of Pirelli, Monterey and Qeyton Systems are not enjoying the momentum that the Cerent products are.

Cisco's overall market share in optical is minuscule compared with entrenched giants such as Lucent, Nortel, Alcatel, Ciena, Fujitsu and Marconi.

"Cerent has done really well, but a SONET mux is not an optical strategy," Passmore says. "They still haven't shipped much of Monterey, and they still have work and acquisitions [to complete] to compete."

Size and product/technology concerns aside, attracting and retaining talented employees and maintaining the Cisco culture may be the company's biggest challenge. Fifty percent of Cisco's workforce has been at the company 18 months or less, Chambers said.

As Cisco gets bigger, it loses a little bit more of its identity and unique characteristics. Couple this with the law of large numbers — declining revenue and earnings growth with increasing size — and the value of stock options, a key carrot for attracting talented people, declines.

"You've grown at an accelerated, rapid rate," Dzubeck says. "To keep up with that rate you have to keep stoking the coals." ◪

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Cisco set to roll out high-speed optical router

BY JIM DUFFY

SAN JOSE — Cisco this week will unveil a new router that will let users provision services at the edge of metropolitan optical networks.

For companies, the new 7600 Optical Services Router (OSR) could open up a variety of new, high-speed IP services, such as VPNs, that can be provisioned flexibly and dynamically over optical fiber. Optics let services be delivered faster and in a wider variety of options than does electronics, experts say.

The 7600 OSR is based primarily on Cisco's Catalyst 6500 LAN switch. It uses the Catalyst 6500's 256G bit/sec switching fabric and nine-slot Network Equipment Building Standards-compliant chassis to support new service modules designed for service provider points-of-presence that consolidate metropolitan optical transport with IP-enabled services.

The modules include Optical Carrier packet-over-SONET and ATM, Gigabit Ethernet WAN, 10/100M bit/sec Ethernet and Gigabit Ethernet LAN, and serial WAN port adapters from the Cisco 7500 router. The router also supports T-1/E-1 and T-3/E-3 WAN port adapters from Cisco's venerable 7500 router.

Cisco claims to have a port density and line-rate service performance advantage over Juniper Networks' edge routers with the 7600 OSR. The router features Cisco's Parallel Express Forwarding (PXF) reprogrammable ASICs processors for forwarding performance of millions of packets per second.

PXF is designed to enable deployment of new Cisco IOS services for Multi-protocol Label Switching, quality of service, security, policing, traffic shaping and filtering. With PXF, the OSR can filter 30 million packet/sec and perform access control lists, traffic policing and shaping at line-rate, Cisco says.

The 7600 is the third Cisco product to support PXF processors. The other two are the 7200 router and the 10000 Edge Services Router, which is targeted at high-density leased line T-1/T-3 aggregation.

Users say the OSR will provide a speedy service-enabling entry point into their backbones.

The basic 7600 OSR system costs $73,000. The entry-level system, with interfaces, starts at $100,000. The interfaces cost from $27,000 to $180,000. The 7600 OSR is available now. Cisco says it is offering "attractive" incentives for 7500 user to upgrade to the 7600. ◪

FalconStor,
continued from page 1

says will let companies create virtual storage pools from data housed in server-attached storage devices and in Fibre Channel-based network-attached storage systems and storage-area networks (SAN).

One upshot of FalconStor's offering: Customers could use it to avoid adding Fibre Channel to their IP nets, says Steve DuPlessie, an analyst with Enterprise Storage Group. While many large businesses have installed Fibre Channel SANs, others have not, citing concerns about training costs and added network complexity.

DuPlessie says FalconStor is months ahead of IP storage competitors and says others tend to focus on IP storage or the pooling of disparate storage resources.

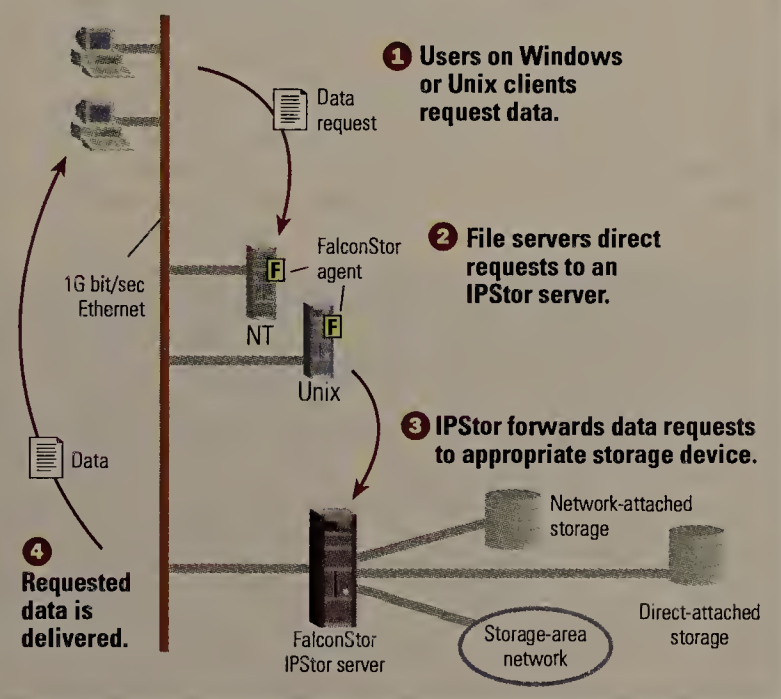
Another thing FalconStor has going for it is a management team with a proven track record. Its CEO is ReiJane Huai, formerly CEO of Cheyenne Software, a company that during the mid-1990s owned more than half the market for LAN-based back-up software (Computer Associates later acquired Cheyenne). The firm, which would not disclose the names of its investors or amount of funding, is named after a French jet.

"People in the networking world don't know that much about storage. For them, storage is a mirage," says Huai, who left Computer Associates last year. "Storage and networking must go together. For storage networking to take hold, we have to rely on platform and interface-independent products and embrace existing and, future interfaces."

In addition to working over IP and supporting Fibre Channel, IPStor will be compatible with SCSI, IBM's Serial Storage Architecture (SSA) and future protocols such as iSCSI, which aims to transfer block-level SCSI data over IP.

How to build a storage pool

FalconStor's IPStor software is designed to give end users access to data stored in any number of places.



The IPStor software also works with HTTP, Windows NT/2000's Common Internet File System and Unix's Network File System.

In an IPStor-enabled network (see graphic), storage that is attached directly to the server is relocated to the IPStor server, which features any combination of 10M, 100M and 1G bit/sec Ethernet connections. Other storage devices can access the IPStor server via SSA, SCSI, Fibre Channel, Ethernet or iSCSI.

Users request data from a Windows NT or Unix file server outfitted with FalconStor agent software. That server sees the IPStor server as just another storage device and relies on it to manage the exchange of data over the network.

Vendors are moving aggressively to handle such data exchanges because the amount of data being stored on nets is skyrocketing. Market research firm IDC says server storage will boom from 205,000 terabytes in 1999 to 1.3 million terabytes next year — a better than five-fold increase over that period.

Vendors such as Nishan Systems and Cisco are readying IP storage switches and routers that will allow the transport of SCSI data and file-oriented data over IP networks. Sources say these companies have no immediate plans to add virtualization — the ability to combine physical storage devices into logical pools — to these products.

Similarly, StorageApps and StoreAge offer data virtualization products but not switches or routers.

One company giving IPStor a shot is Measurisk, a new application service provider in New York.

"We are trying to move away from direct-attached storage because most of the high-density, rack-mounted 1U servers we are installing don't even have the option of server-attached storage," says beta-tester Craig Vogel, director of infrastructure at Measurisk. "We also still want to use IP, as it prevents us from having to learn about Fibre Channel to install storage in a SAN configuration."

"Now we can get the same performance over IP for our data as we would over Fibre Channel," says Vogel, who has laid Category 5, unshielded, twisted-pair wiring instead of fiber-optic cables for his Gigabit Ethernet backbone.

"IPStor obviates the need for us to get into fiber," he says. "Being able to implement a technology immediately without reworking anything is a big plus."

FalconStor will supply customers with browser-based IPStor Manager software to manage their storage nets from anywhere on the network. The software will support active-active failover, replication of data and snapshot backups to disks or tapes. IPStor Manager discovers all storage devices on a net and can forward statistics to management platforms from Computer Associates, Hewlett-Packard and Tivoli.

The basic software will ship in April and start at $10,000. Optional programs to support mirroring, snapshots and replication will start at $2,000.

FalconStor: www.falconstor.com

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Backspin

Double opt-in done right

MARK GIBBS

Let's start a simple crusade that will benefit us all. The crusade is to get companies using e-mail for marketing to properly use double opt-in. We will cure them of their ignorance by embarrassing them.

Why do we need double opt-in? To deal with people who go to the Diapers 'R' Us Web site, sign up for "Baby Diaper Offers Daily" and put in the wrong address.

Maybe they use the wrong address because the intense emotions caused by the promise of diaper data interferes with their higher brain functions, or perhaps they suffer a seizure while typing, or perhaps they are just too stupid to know their own identities.

How difficult is it to get a sequence of thirty or forty characters right when those characters represent you? Apparently from the amount of misdirected e-mail I get, much harder than one would think.

Getting someone else's address wrong is not too surprising. I regularly get e-mail for people at several companies, such as Gibbs and Associates, Gibbs Die Casting and the Katharine Gibbs School. You can see why — their domains are gibbscam.com, gibbsdc.com and kgibbs.com.

I said getting someone else's address wrong was not too surprising, but actually when it is a vendor sending a message to a client and the vendor can't get the domain right, you have to wonder how sparky the vendor is (again, the Katharine Gibbs School seems to have rather more than its fair share of dumb vendors). But I digress....

Anyway, in my experience, when someone signs up for something and gives the wrong address, many sites — the ones that don't understand double opt-in — do one of three things. These lame outfits either, 1) just start sending their fetid, turgid ramblings (really annoying) or, 2) send me a message saying that I have requested to receive their fetid ramblings.

At this point, if the site really wants to tick me off they can offer me an unsubscribe service that requires I send a message requesting removal from the account they sent the message to in the first place.

This is, of course, a huge pain because I get all messages sent to gibbs.com. So I either have to send the cease-and-desist message or set up yet another filter to kill their messages on receipt. I already have an ungodly number of filters under Outlook 2000, and as they don't seem to be reliable I prefer not to push my luck (have you seen the same problem?).

The third choice for these sites is to invite me to go to their Web site and deregister using the password I set up for the account. Terrific! I don't think I need to go into exactly why this is problematic....

So let me explain how double opt-in works: When a user thinks he is opting-in to a mail list and enters his address on some site, the site should send a message to the address saying that if the recipient wishes to subscribe to the list, he should reply to enable the account.

The sender should then wait for perhaps as much as a couple of weeks for a reply and, if received, start the account. If no reply is received within the timeout period the site should then purge the account or the e-mail address.

Unfortunately, this methodology seems to be beyond sites such as classmates.com, which offers you a link to the unsubscribe page on its Web site that requires you to log on to modify the account, and if you forget your password you get a link to have your password mailed to you, so you have to wait for that message, then go back to the site, log on and ... well, they just don't get it.

I'll bet you have found the same problem with many sites, so here's the plan — send me the sites that, like classmates.com, don't get it and explain what the site does wrong. I'll start compiling a list of offenders and we'll begin to hassle them. It's for their own good.

Opt-in to the crusade at crusade@gibbs.com — regular comments to nwcolumn@gibbs.com.

'NET BUZZ

The latest on the Internet industry

PAUL MCNAMARA

Does Napster have an MP3 of the fat lady's greatest hits?

The diva of doom is in full-throated warble over the all-but-certain demise of this extraordinarily popular hangout for digital shoplifters.

Bravo, indeed.

The fate of Napster as a commercial entity is not and never has been the primary concern, at least not among those who can see beyond the base desire to score a free copy of whatever Eminem drivel is topping the charts.

What the U.S. Court of Appeals for the Ninth Circuit did last week was nothing less than reiterate the rule of intellectual property law in what was quickly becoming a Wild, Wild West on the World Wide Web. Any notion that technology such as Napster and its peer-to-peer offspring have rendered old-economy law irrelevant has been effectively — if not permanently — laid bare as the nonsense it was all along.

Napster is but a tiny sliver of what was at stake here. Still, it's worth taking a good close look at the judges' ruling because the lessons therein will offer guidance as new Internet technologies inevitably mature into viable, legal businesses.

The news summaries you may have read fail to do justice to the breadth and depth of the flogging Napster absorbed in this 19-page ruling. With only an inconsequential exception or two, the three judges addressed, analyzed and fully repudiated each and every one of the arguments Napster, its lawyers and apologists have trotted out since this case became a cause celebre. Among them:

- "Napster is a mere conduit and can't be held responsible." Brushed aside.
- "Users themselves aren't doing anything wrong even if Napster might be." Backhanded.
- "It's just like videotaping a TV show." Not legally.
- "There's no harm here because Napster is good for CD sales." Don't make us laugh, they intoned.

Naturally, the justices made these pronouncements more civilly and wrapped them in the requisite legalese, but anyone else who has found the pro-Napster rap unconvincing and tedious won't mind wading through this document. Go see for yourself at http://lvalue.com/nap.html.

Napster insists, at least for public consumption, that it will appeal all the way to the Supreme Court. Don't count on that happening. The full appeals court is unlikely to reverse this emphatic judgment. And anyone who believes our Supreme Court might side with Napster couldn't name the nine justices if you spotted them a Clarence and an Antonin.

The more reasonable Napsteristas have long professed a willingness to pay for what until now has been their pick of purloined MP3s. Just don't gouge us, they say. It's time for them to pay the piper.

There's something unsettling about a press release from the "Invest in Sweden Agency" that brags about that country being "ranked first as the world's dominant information economy for the second straight year while the United States slipped to fourth [from second]."

Says who?

That would be the **2001 IDC/World Times Information Society Index,** which ranks nations by prowess in four broad IT categories: computer, information, Internet and social infrastructures.

Norway and Finland took home the bronze and silver.

According to this index, the U.S. rates ninth in information infrastructure and a lowly 17th in social infrastructure.

This report is unlikely to cause a ripple among U.S. industry leaders and policy makers. We are an arrogant bunch.

However, it's one thing to be arrogant when you're clearly the best at something, be it basketball or amassing nuclear weapons. A little introspection might be in order when Scandinavia's kicking sand in your face.

Comments, news tips and Napster eulogies are always welcome. The address is buzz@nww.com.

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